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*Technical Report No. 32-523*

*Tracking System Data Analysis Report  
Ranger 4 Final Report*

*W. R. Wollenhaupt*

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JET PROPULSION LABORATORY  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
PASADENA, CALIFORNIA

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Operations Section

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PASADENA, CALIFORNIA**

March 1, 1964

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## CONTENTS

<b>I. Introduction</b>	1
A. History of Mission	1
B. System Configuration	2
1. Ground Station Modes	2
2. Spacecraft Modes	2
C. Data Evaluation Techniques	3
<b>II. Performance Analysis</b>	4
A. Preflight Calibrations	4
1. DSIF 1 (Mobile Tracking Station, South Africa)	4
2. DSIF 2 (Pioneer Site, Goldstone)	4
3. DSIF 3 (Echo Site, Goldstone)	4
4. DSIF 4 (Woomera)	4
5. DSIF 5 (Johannesburg)	5
B. Postflight Analysis of Station Performance During Mission	5
1. DSIF 1 (Mobile Tracking Station, South Africa)	5
2. DSIF 2 (Pioneer Site, Goldstone)	6
3. DSIF 3 (Echo Site, Goldstone)	6
4. DSIF 4 (Woomera)	7
5. DSIF 5 (Johannesburg)	7
<b>III. Final Orbit</b>	9
<b>Appendixes</b>	
A. DSIF and Spacecraft Characteristics	11
B. Equations Used in Data Evaluation	17
C. Results of <i>Ranger 4</i> Preflight Calibration Tests	19
D. Hourly Trajectory Listing from Injection to Impact	23
E. History of Ground Modes and Transmitter VCO Frequencies	74
F. Final Orbit Residual Listing	76
<b>References</b>	108

## TABLES

1. Nominal view periods vs actual tracking periods . . . . .	2
2. Commands sent to <i>Ranger 4</i> spacecraft by DSIF 5 . . . . .	8
3. Summary of data used in orbit determination . . . . .	9
4. Tracking data noise statistics . . . . .	9
5. Errors in position and velocity vectors at injection based on tracking data noise statistics only . . . . .	9
A-1. DSIF characteristics for <i>Ranger 4</i> . . . . .	11
A-2. Doppler reference frequencies used at the DSIF stations . . . . .	11
C-1. Coefficients for optical pointing error . . . . .	19
C-2. Coefficients for optical star tracks and postflight analysis . . . . .	19
C-3. <i>Ranger 4</i> preflight boresight-vs-polarization-angle test . . . . .	20
E-1. <i>Ranger 4</i> DSIF tracking history . . . . .	74
E-2. Transmitter VCO frequencies . . . . .	75

## FIGURES

A-1. Mobile tracking station (DSIF 1) . . . . .	12
A-2. Goldstone Pioneer Site (DSIF 2) . . . . .	12
A-3. Goldstone Echo Site (DSIF 3) . . . . .	13
A-4. Woomera tracking station (DSIF 4) . . . . .	14
A-5. Johannesburg tracking station (DSIF 5) . . . . .	15
A-6. Spacecraft communications system . . . . .	16
C-1. Preflight star track results, April 10, 1962 (DSIF 4) . . . . .	21
C-2. Preflight star track results, April 3, 1962 (DSIF 5) . . . . .	21
C-3. Preflight star track results, April 12, 1952 (DSIF 5) . . . . .	22
D-1. C-2 doppler residuals (DSIF 1) . . . . .	23
D-2. C-2 doppler truncation (DSIF 2) . . . . .	23
D-3. RF boresight shift (DSIF 2) . . . . .	23
D-4. C-1 doppler residuals (DSIF 2) . . . . .	24
D-5. 30-Mc bias OSC frequency (DSIF 2) . . . . .	24
D-6. C-1 doppler residuals (DSIF 3) . . . . .	24
D-7. Angular residuals vs hour angle (DSIF 4) . . . . .	25
D-8. Angular residuals vs hour angle (DSIF 5) . . . . .	25
D-9. Angular residuals vs hour angle (DSIF 5) . . . . .	26
D-10. C-2 doppler residuals (DSIF 5) . . . . .	26
D-11. Pseudo two-way doppler residuals (DSIF 5) . . . . .	27

## ABSTRACT

23520

The analysis of the Deep Space Instrumentation Facility (DSIF) spacecraft tracking performance during the *Ranger 4* mission is summarized. Included are ground system configurations, station view periods, and a discussion by station and view period of all tracking data; i.e., angular and doppler, taken by the tracking stations. Also presented is a summary of the tracking data which were actually used in determining the spacecraft orbit and the noise statistics of these data.

Author

## I. INTRODUCTION

This report summarizes the analysis of the Deep Space Instrumentation Facility (DSIF) tracking performance during the *Ranger 4* mission. It supercedes all previous Tracking Data Analysis reports for this mission.

### A. History of Mission

The *Ranger 4* spacecraft, using the *Atlas D-Agena B* booster, was launched from the Atlantic Missile Range (AMR) on April 23, 1962 at 20 hr, 50 min, 15 sec (20:50:15) Greenwich Mean Time (GMT). Based on AMR tracking data, *Atlas-Agena* separation appeared normal, and at *Agena B* first engine cutoff the spacecraft was in a circular parking orbit at an altitude of 185 km and a space fixed velocity of 7.800 km/sec (see Ref. 1). The parking orbit was terminated 254 sec later by *Agena B* second engine ignition. *Agena B* second engine cutoff (at 21:04:15 GMT) concluded all powered flight for the *Ranger 4* spacecraft and represented the time of injection into a lunar intercept trajectory. During this launch to injection phase, the spacecraft was tracked by AMR stations.

Initial acquisition of the spacecraft transponder by the DSIF was made by the Mobile Tracking Station (MTS, DSIF 1) at 21:13:12 GMT. Prior to acquisition by this station, a malfunction had occurred in the spacecraft which affected the Central Computer and Sequencer

(CC&S). This conclusion was based on the following: (1) all telemetry channels were in lock at DSIF 1 but no telemetry commutation was occurring and (2) no blips were observed on Channel B-2 at the scheduled time of solar panel extension nor at any of the times when the subsequent CC&S commands were to be given. Because of the malfunctions it was not possible to command the spacecraft and a midcourse maneuver did not occur.

The DSIF continuously tracked the transponder signal from initial acquisition until battery depletion at 07:22 GMT on April 24, 1962. For the remainder of the mission the DSIF stations tracked the capsule beacon signal, except for short periods during which unsuccessful searches were made for the transponder signal. Because of the spacecraft malfunction, a terminal maneuver was not attempted. Lunar occultation, as determined by loss of received signal at Goldstone Pioneer Site (DSIF 2) and Echo Site (DSIF 3), occurred at 12:47:46 GMT on April 26, 1962. DSIF 2 and DSIF 3 continued to listen for the beacon signal until approximately 13:30 GMT. No signals were detected; therefore, it was concluded that the spacecraft impacted the moon and tracking operations ceased. Based on the orbit determined from the transponder data, lunar impact occurred (on the dark side of the moon) at 12:50:00 GMT. The total flight time from injection to lunar impact was 63.76 hr (Ref. 1). Table 1 summarizes the nominal station view periods vs the actual tracking periods.

Table 1. Nominal view periods vs actual tracking periods

Date	DSIF Station	Nominal <sup>a</sup>			Actual		
		Rise, GMT	Set, GMT	View period	Acquisition, GMT	End of track, GMT	Tracking period
April 23-24	1	21:13:45	08:39:19	11 <sup>h</sup> 27 <sup>m</sup>	21:13:19	08:35:20	11 <sup>h</sup> 22 <sup>m</sup>
	5	21:13:45	08:39:19	11 <sup>h</sup> 27 <sup>m</sup>	21:14:37	08:43:20	11 <sup>h</sup> 29 <sup>m</sup>
	4	22:29:19	23:49:19	1 <sup>h</sup> 20 <sup>m</sup>	22:22:00	00:06:00	1 <sup>h</sup> 44 <sup>m</sup>
April 24-25	2	08:34:19	16:58:54	8 <sup>h</sup> 25 <sup>m</sup>	08:32:40	17:05:35	8 <sup>h</sup> 33 <sup>m</sup>
	3	08:28:45	16:58:54	8 <sup>h</sup> 30 <sup>m</sup>	09:00:40 <sup>b</sup>	17:07:20	8 <sup>h</sup> 07 <sup>m</sup>
	4	13:59:19	01:54:19	11 <sup>h</sup> 55 <sup>m</sup>	13:52:44	01:58:59	12 <sup>h</sup> 06 <sup>m</sup>
	1	Not scheduled to track					
	5	21:24:49	09:20:13	11 <sup>h</sup> 55 <sup>m</sup>	21:21:35	09:25:11	12 <sup>h</sup> 04 <sup>m</sup>
April 25-26	2	08:56:00	12:47:46	9 <sup>h</sup> 52 <sup>m</sup>	08:47:30	17:48:20	9 <sup>h</sup> 01 <sup>m</sup>
	3	Not scheduled to track					
	4	14:16:19	02:12:19	11 <sup>h</sup> 56 <sup>m</sup>	14:23:00	02:13:06	11 <sup>h</sup> 50 <sup>m</sup>
	1	Not scheduled to track					
	5	21:42:19	09:28:19	11 <sup>h</sup> 46 <sup>m</sup>	21:40:13	09:32:08	11 <sup>h</sup> 51 <sup>m</sup>
April 26	2	08:56:19	12:47:46 <sup>c</sup>	3 <sup>h</sup> 51 <sup>m</sup>	08:46:00	12:47:46	4 <sup>h</sup> 02 <sup>m</sup>
	3	08:46:54	12:47:46 <sup>c</sup>	4 <sup>h</sup> 01 <sup>m</sup>	08:33:00	12:47:46	4 <sup>h</sup> 15 <sup>m</sup>

<sup>a</sup>Based on 5-deg elevation angle constraint for AZ/EL stations and 90-270 deg hour angle constraint for HA/DEC stations.  
<sup>b</sup>Station searched for transponder from 07:48:50 to 09:00:00 GMT.  
<sup>c</sup>Spacecraft occulted by moon.

## B. System Configuration

The detailed characteristics of the DSIF stations and the spacecraft are given in Appendix A.

### 1. Ground Station Modes

For the *Ranger 4* mission there were four possible modes of operation of the DSIF. They are identified as Ground Modes and are defined as follows:

GM-1. Ground receiver tracks the transponder signal (960.05 Mc) in the two-way doppler mode, taking both angular and C-2 data. This mode is possible at DSIF 1, 3, and 5 (Johannesburg DSIF Station).

GM-2. Ground receiver tracks the transponder signal (960.05 Mc) in the one-way doppler mode, taking both angular and C-1 data. This mode is possible at all DSIF stations.

GM-3. Ground receiver tracks the transponder signal (960.05 Mc) in the pseudo-two-way doppler mode, taking both angular and C-3 data. This mode is possible with the combination DSIF 1, 4 (Woomera Station), 5, (noncoherent) or DSIF 2, 3 (coherent).

GM-4. Ground receiver tracks the capsule beacon signal (960.15 Mc) in the one-way doppler

mode, taking both angular and C-1 data. This mode is possible at all DSIF stations.

### 2. Spacecraft Modes

The spacecraft modes are defined according to the telemetry system mode for that portion of the mission. They are as follows:

TM-I. From launch to start of midcourse maneuver, approximately 16 hr.

TM-II. Midcourse maneuver, approximately 28 min.

TM-III. Post-midcourse maneuver to end of terminal maneuver, approximately 48 hr.

TM-IV. End of terminal maneuver to bus impact, approximately 40 min.

TM-V. Capsule impact to end of mission, 60 day nominally.

Because of the spacecraft malfunction, the spacecraft stayed in the TM-I mode for the entire mission.



### C. Data Evaluation Techniques

The Orbit Determination Program (ODP) will determine a spacecraft orbit by converging on the set of initial conditions at injection epoch, which causes the weighted sum of the squares of the differences between the actual observed values and the computed observed values to be minimized. The computational method is a modified weighted least-squares method. In this method, independent data weighting values are determined from the measured effective variances. Whereas in the usual least-squares method, the data points are weighted, independently, inversely proportionally to their measured variances. When determining the effective variance for each data type at each station, consideration is given to the correlation width of all recognized noise sources, the sampling rates, counting times, elevation angles, and range to the spacecraft.

Prior to being put on the ODP input tape, the incoming data goes through a tracking data editing program (TDEP) which rejects gross blunder points, points that are outside of the antenna mechanical constraints, and points with bad teletypewriter format. No attempt is made to unscramble or correct bad format points. Hence, by sacrificing the possibility of utilizing the maximum number of data points there will be a reduction in the sensitivity to blunder points and possible error points that might otherwise have a significant effect on the orbit.

The current policy for weighting data is to assign an initial weight for each data type based on the sample rate, count time, and expected data quality. These weights may be changed (on option) when the sample rate and count time changes or when the residuals indicate periods of extremely good or relatively poor tracking data.

Data evaluation techniques, consistent with the ODP computational methods, have been developed with the

goal of isolating and removing systematic errors, and determining the characteristics of tracking data noise statistics; i.e., the RMS and mean values of the residuals (observed minus computed). The pertinent equations used are given in Appendix B. There are essentially two phases in the mission tracking evaluation: in-flight and postflight.

In the in-flight phase, station reports are analyzed to detect any unusual occurrences. Also, transmitter VCO drift statistics are compiled, frequency changes are noted and brought to the attention of the ODP group, and changes in transmitter assignment are evaluated. After the orbit is reasonably well known, observed values are checked against predicted values to determine validity of the tracking data and to detect blunder points before they influence the orbit. Certain parameters such as the doppler system figure of merit ( $g^2$ ) are computed and used to evaluate the quality of the incoming doppler data. Once the ODP listings are available, the residuals and rejected points are analyzed to detect systematic error sources. The Test Director is informed of all unusual occurrences, and if applicable, corrective action is recommended.

The postflight evaluation phase consists of analyzing all available data pertaining to the DSIF tracking performance. Complete analysis of all residuals, by data type, is made to detect equipment biases, periodic noise which might be attributed to station equipment, and any other systematic errors. The validity of the noise model is checked by least-square fitting the tracking data. All observations are evaluated and compared with preflight calibrations and past performance. All indications of equipment problems and nonstandard occurrences are investigated and recommendations made to the appropriate agencies. New data analysis techniques are investigated and implemented if applicable.

## II. PERFORMANCE ANALYSIS

### A. Preflight Calibrations

In order to improve the quality of the primary angular data going into the Orbit Determination Program (ODP), it is first corrected for the antenna optical pointing error (OPE). For the angle data stations, DSIF 4 and 5, this error was determined from a series of independent, horizon-to-horizon, star tracks conducted in 1961-1962. A polynomial curve fit was made to the differences between the refraction corrected ephemeris values and the observed values read from the angle encoders. The OPE is then represented by the coefficients of the resulting polynomials. In general, the preflight calibration star tracks are required for two purposes: (1) to detect gross system errors and (2) to test the validity of the correction polynomial. The coefficients used for the RA 4 in-flight computations may be seen in Appendix C.

Experience gained in *Ranger 3* has shown that the OPE coefficients do not remove all systematic pointing errors. This is reasonable since the RF and optical axis of the antenna are not necessarily the same. That is, the RF axis is a function of the position of the quadripod feed, whereas the optical axis is not. Thus, if there is a quadripod deflection (due to thermal effect and/or gravitational loading) at some given instant of time, the optical error and the RF error would not be the same. Further, the optical refraction and the RF refraction are not the same due to the difference in respective wavelengths. In addition to these effects, the RF pointing error is also a function of feed alignment, received signal-to-noise ratio, and received polarization angle (since the antenna null pattern does not have the same slope at all polarization angles). The RF boresight-vs-polarization-angle test was an attempt to study the RF errors. The test was designed to correlate the optical and RF errors observed at the collimation tower over a range of signal levels and polarization angles. Experience has shown that the results of the test cannot be applied to the in-flight data in a meaningful manner. Hence, for the purpose of describing the RF pointing error the test is inadequate, and a new method for determining the RF antenna calibration is required. However, the tests are required to add to the composite statistical data, and they are an excellent indication of RF system status and autotrack capabilities.

After the completion of the mission, a study was made to improve the coefficients of the correction polynomial. A polynomial curve fit was made to the first pass angu-

lar residuals (that is, the difference between the ODP computed values and the OPE corrected values) of DSIF 4 and 5 for both RA 3 and 4. The coefficients of this polynomial were combined with the OPE coefficients. Results of the study show that the total angular error has been reduced to approximately  $\pm 0.02$  degrees in both hour angle and declination. These new coefficients are shown in Appendix C. Use of this method for future missions is being studied.

The following preflight calibration tests were made by the DSIF stations for *Ranger 4*. Numerical results and star track plots may be seen in Appendix C.

#### 1. DSIF 1 (Mobile Tracking Station, South Africa)

A boresight-vs-polarization-angle test was conducted on April 9, 1962. Results compared favorably with those of *Ranger 3*.

#### 2. DSIF 2 (Pioneer Site, Goldstone)

A star track of Alpha Virginis (Spica) was conducted on April 18, 1962. Hour angle residuals compared favorably with previous star tracks. No comment can be made on the declination residuals since the antenna appeared to be locked in declination. A new test was not requested since DSIF-2 is not a primary angle station.

#### 3. DSIF 3 (Echo Site, Goldstone)

Nine short term star tracks were conducted on April 13, 1962. The stars tracked were Alpha Aquilae (Altair), Alpha Lyrae (Vega), Beta Herculis (Antares), Alpha Bootis (Arturus), Alpha Virginis (Spica), Epsilon Ursae Majoris (Alioth), Alpha Leonis (Regulus), Lambda Scorpii (Shaula), and Sigma Sagittarii (Nunki). Results compared very well with the previous star tracks. In addition, a boresight-vs-polarization-angle test was also conducted on April 13, 1962. Results of this test compared favorably with those of *Ranger 3*.

#### 4. DSIF 4 (Woomera)

A horizon-to-horizon star track of Alpha Virginis (Spica) was conducted on April 10, 1962. Based on the results of this track, it was decided to change the declination coefficients of the correction polynomial used for *Ranger 3*. The hour angle coefficients were not changed. On April 14, 1962 a boresight-vs-polarization-angle test was conducted. Results compared favorably with those of *Ranger 3*.

## 5. DSIF 5 (Johannesburg)

A horizon-to-horizon star track of Beta Corvi was conducted on April 3, 1962. Hour angle residuals did not agree with those seen on previous star tracks from this station; therefore another track was requested. This track (of Alpha Virginis) was conducted on April 12, 1962, and results compared very well with previous star tracks. In addition, a boresight-vs-polarization-angle test was also conducted on April 12, 1962. Results compared favorably with those of *Ranger 3*.

## B. Postflight Analysis of Station Performance During Mission

As a result of the spacecraft malfunction, the spacecraft continued to tumble throughout the entire mission with a periodicity of approximately four minutes. This could be seen in both the angular and doppler residuals. Further verification was given by the periodic variation in AGC signal strength levels. In general, the AGC levels were lower than would be expected for a normal mission since it was impossible to change to the spacecraft high-gain antenna. These lower signal levels caused some difficulty in maintaining lock during later passes.

The following is a station-by-station postflight analysis of DSIF tracking performance during the mission. It is based on all available data such as real time tracking data, in-flight station reports, station logs, calibration books, etc. All times listed refer to Greenwich Mean Time (GMT). Residual plots of all data used in the orbit determination, and plots of subsequent data which are of particular interest, are shown in Appendix D. Also included in this appendix is an hourly trajectory listing, by station, from injection to impact. Pertinent equations used in the data analysis are shown in Appendix B. Appendix E contains a mission history of ground station mode versus time and pass, and a history of transmitter VCO frequency during the transponder tracking period.

### 1. DSIF 1 (Mobile Tracking Station, South Africa)

The transponder signal was first heard at 21:13:12 on April 23, 1962, and one-way acquisition was completed 21:13:19. At this time all telemetry channels, except channel 1, were in lock but there was no telemetry commutation. Two-way lock was not established until 21:28:48 with the first good data being transmitted at 21:30:11. This delay in two-way acquisition was caused by the following:

1. DSIF 5 had indicated good telemetry after acquisition at 21:14:37. This made it appear that DSIF 1 had either equipment problems or that they were on a side lobe. Hence, time was lost in making additional searches for the main carrier.
2. The telemetry channels in lock were very noisy which again made it appear that the station was on a side lobe.
3. When two-way acquisition was attempted, the station two-way doppler indicator did not show good two-way lock. The indicator referred to is the station internal 10-cps oscillator, the output of which is phase modulated in the ground transmitter and sent to the spacecraft. It is retransmitted from the spacecraft and appears at the ground receiver in the output of a phase detector circuit where a maximum positive voltage was considered to indicate a good two-way lock. Subsequent investigation revealed that the output of the phase detector is range dependent. Further, the voltage associated with a good two-way condition could be either positive or negative depending on range. At the time in question the sign of the detector output voltage was negative. Hence, it appeared as though the indicator was not functioning properly.

The transmitter was turned off at 23:05:00 with DSIF 5 acquiring two-way lock at 23:07:00. At 23:38:00 the transmitter was again turned on and two-way lock was completed at 23:40:00. The transmitter was then turned off at 00:06:00 and pseudo two-way lock was completed at 00:07:34. Tracking was continued in this mode until the transponder signal was lost due to battery depletion at 07:22. Unsuccessful searches were made for the capsule beacon signal until 08:35:20. This concluded the first pass. The station was not scheduled to track during subsequent passes.

Angular residuals are large, particularly in azimuth where the error at times is one degree. Also, there still appears to be a hitching problem. However, DSIF 1 angular data is not used in the ODP, hence, these large errors do not affect the computed orbit. A total of 881 C-2 doppler data points were received from this station during the mission. Of this number, 703 data points were used in the orbit determination. The remainder were rejected because of bad data condition, bad teletypewriter format, or they were blunder points. A least-squares technique was used to determine the quality of the raw C-2 doppler data, i.e., the doppler data from the incoming data tape. The standard deviation of the data

taken during the transponder tracking period was determined to be 0.602 cps. For this same period, the ODP computed standard deviation (using a different method) was 0.639 cps. The difference between the two values is most probably caused by using slightly different rejection criteria. Quality of the two-way doppler data taken during this mission compares very well with the data taken during the *Ranger 3* mission (standard deviation = 0.677 cps). The waveform appearing in the C-2 doppler residuals of Fig. D-2 of Appendix D is a result of doppler counter truncation error caused by the round-off mechanism of the doppler counter. Transmitter VCO drift was within the specification of 1 part in  $10^8$  per 15 min during the entire pass. The VCO frequencies during the two-way doppler tracking period may be seen in Table E-2 of Appendix E. AGC signal strength readings ranged between -118 dbm and -146 dbm.

## 2. DSIF 2 (Pioneer Site, Goldstone)

The transponder battery was depleted approximately 1 hr and 10 min before the first RA-4 spacecraft view period for this station. Hence, DSIF 2 was confined to tracking the capsule beacon in ground mode GM-4 during all passes.

Initial acquisition of the beacon signal occurred at 08:32:40 on April 24, 1962. At 10:04:49, a comparison of the receiver VCO frequencies between this station and DSIF 3 revealed that both stations had been tracking on a side lobe rather than the main carrier. That is, there was a difference of 38 cycles between the receiver VCO frequencies at DSIF 2 and DSIF 3 which could be accounted for by the receivers being locked on opposite sidebands. The VCO frequency was adjusted and the main carrier was in lock at 10:07:23. Tracking continued normally with the exception of short periods during which the receiver dropped out of lock because of the low signal level (AGC readings ranged from -147 dbm to threshold during the pass). At 15:50:00 it was discovered that the precision bias doppler loop had been out of lock since 14:20:00. Also of interest during the first tracking period was an abrupt boresight shift of approximately -0.01 deg in declination (Fig. D-3). The time of the shift corresponds roughly with the time of local sunrise and could be accounted for by a feed quadrupole deflection due to a thermal effect. This same phenomenon had been observed at DSIF 5 during *Ranger 3*, and subsequent tests conducted at Johannesburg (see Ref. 2), verify this conclusion. DSIF 2 data, taken during this and subsequent passes, were not used in the orbit computation. The tracking period was terminated at 17:03:13 when the spacecraft went below the station horizon.

On the second view period, April 25, the beacon signal was acquired at 08:47:30. There was a malfunction of the Coordinate Converter computer and as a result the servo system was operated in the "aided track" mode. Three unsuccessful, 30-min searches for the transponder signal were conducted at 09:30, and 13:00, and 17:30. The receiver dropped lock a total of 39 times during the tracking period because of low signal strength. AGC readings ranged from -142 dbm to threshold. Tracking period was terminated at 17:48:20.

The third view period acquisition occurred at 08:46:00 on April 26, 1962. One unsuccessful, 5 min search for the transponder was made at 09:42:00. Tracking continued normally with the exception of short periods when the receiver dropped lock due to low signal strength. The one-way doppler data taken during this period was not required for computing the orbit; but it was critically needed to verify the orbit which had been computed from the transponder data, and to verify lunar impact. In the equation for determining the doppler shift from C-1 data there are two unknowns, namely, the true capsule beacon frequency and the 30 mc bias oscillator frequency. Therefore, it is imperative that an accurate record of the bias oscillator frequency be maintained, particularly during critical periods. During this pass, analysis showed that the bias oscillator drift exceeded the 1 part in  $10^6$  per hour specification and was varying somewhat periodically (Fig. D-5). This drift should have been noted in the in-flight station reports, and the bias oscillator frequency should have been monitored at more frequent intervals. As a result of these omissions, the C-1 data was not usable (a plot of this data may be seen in Fig. D-4). The capsule beacon signal was lost at 12:47:46.8 when the spacecraft was occulted by the moon. This time was determined from the station Midwestern analog recording. DSIF 2 continued to search for the capsule signal until 13:30:00. No signal was detected; therefore, it was concluded that the spacecraft impacted the moon. This terminated the tracking period and the mission.

## 3. DSIF 3 (Echo Site, Goldstone)

The transponder battery was depleted approximately 1 hr and 10 min before the first RA-4 spacecraft view period for this station. Therefore, tracking was confined to ground mode GM-4 during all passes.

From 07:48:50 to 09:00:00 on April 24, 1962, an unsuccessful search was made for the transponder signal. Initial acquisition of the capsule beacon signal occurred at 09:00:40. As previously noted in the DSIF 2 analysis,

it was discovered that the station had been tracking on a side lobe prior to 10:08:48. Two additional and unsuccessful, 30-min searches were made for the transponder signal at 12:30:00 and 15:30:00. During the pass the receiver was periodically dropping lock due to low signal strength. AGC signal strength ranged from  $-141$  dbm to threshold. Data taken during this and subsequent passes were not used for computing the spacecraft orbit. The tracking period ended at 17:04:52 when the spacecraft went below the station horizon.

DSIF 3 was not scheduled to track during the second Goldstone view period.

On the third view period, initial acquisition of the beacon signal occurred at 08:33:00 on April 26, 1962. One unsuccessful attempt was made to acquire the transponder signal at 09:52:00. The same general comments made for the C-1 beacon doppler data in the DSIF 2 analysis are applicable for DSIF 3. Again it must be noted that the 30-mc bias oscillator frequency was not monitored often enough. At 11:55:00, automatic recording of the bias oscillator frequency ceased. Some manually recorded frequencies were submitted after 11:55, but they did not agree with the previous frequencies.

That is, the slope of the manually recorded frequencies was entirely different from that of the automatically recorded frequencies. In the ODP, frequencies were obtained between 11:55 and occultation by extrapolation based on the slope of the automatically recorded frequencies. After this was done, the C-1 data was usable for verifying lunar impact. These results are discussed in Sec. III. Using DSIF 3 data, the capsule beacon frequency drift was estimated to be 1.65 cycles/min during the period 11:25–11:55. Lunar occultation, determined from the analog recording of the receiver functions, occurred at 12:47:46.9. DSIF 3 continued to search for the capsule signal until 13:30:00. No signals were detected; therefore it was concluded that the spacecraft impacted the moon. This terminated the tracking period and the mission.

#### 4. DSIF 4 (Woomera)

The transponder signal was initially acquired in ground mode GM-3 at 22:22:00 on April 23, 1962. At 22:43:00 DSIF 4 acquired the capsule beacon signal and tracked it until 23:00:00. Pseudo two-way transponder tracking was reestablished at 23:00:10. Tracking continued normally in this mode until the spacecraft went below the station horizon at 00:06:00 on April 24, 1962. During this first view period a total of 87 hour angle and declination

data points were received at the Jet Propulsion Laboratory (JPL) (C-3 doppler data from DSIF 4 were not used in the ODP since more accurate C-2 data was available from either DSIF 1 or DSIF 5). Of this number, 35 points were used in determining the RA-4 spacecraft orbit. The remainder were rejected because of bad teletypewriter format, bad data condition code, or they were blunder points. The high percentage of rejection (59.8%) is a result of tracking through the spacecraft "turn around" period during which the spacecraft rate is rapidly changing. Angular residuals show the spacecraft tumble; but otherwise they appear normal. Transponder AGC signal strength levels ranged between  $-113$  dbm and  $-123$  dbm with a periodic variation of four minutes.

Prior to the second view period, the transponder battery was depleted. Hence, subsequent tracking was confined to the capsule beacon signal with the exception of short periods when unsuccessful searches were made for the transponder signal. Initial acquisition of the beacon signal on the second pass occurred at 21:21:35 on April 24, 1962. Tracking continued normally except for short periods when receiver lock was dropped because of low signal strength. AGC readings during the tracking period ranged between  $-139$  dbm and threshold. Angular residuals showed a relatively large error (as great as  $\pm 0.8$  degrees), and excessive scatter due to low signal strength. These data were not used in the ODP therefore the errors did not affect the computed orbit. The tracking period was terminated at 01:58:59 on April 25, 1962.

On the third view period, the beacon signal was acquired at 14:23:00 on April 25, 1962. During the pass, three unsuccessful 30-min searches were made for the transponder. The receiver was periodically going out of lock because of low signal strength. AGC readings ranged between  $-149$  dbm and threshold. The tracking period ended at 02:13:06 April 26, 1962. This concluded DSIF 4 participation in the *Ranger 4* mission.

#### 5. DSIF 5 (Johannesburg)

The transponder signal was acquired in ground mode GM-3 at 21:14:37 on April 23, 1962. Tracking continued in this mode until the MTS transmitter was turned off at 23:05:43. DSIF 5 transmitter was turned on at 23:07:00 and two-way lock was completed at 23:07:55. During the period 23:39:54 to 00:06:00, DSIF 1 again assumed the transmitting assignment with this station tracking in the GM-3 mode. At 00:07:00 the transmitter was again turned on and two-way lock was completed at 00:07:54. Two-way lock was lost at 07:21:50 when the transponder battery was depleted. During the trans-

ponder tracking period, DSIF 5 transmitted a total of 18 commands in an unsuccessful attempt to obtain a response from the spacecraft. These commands, and the time that they were sent may be seen in Table 2. The capsule beacon signal was acquired at 08:14:30 and tracked until the spacecraft went below the station horizon at 08:43:20 GMT.

**Table 2. Commands sent to Ranger 4 spacecraft by DSIF 5**

Command <sup>a</sup>	Initiated, GMT	Verified <sup>b</sup> , GMT
RTC-0	01:52:20	01:53:02
RTC-0	01:53:23	01:54:02
SC-1	01:57:00	01:57:42
RTC-0	02:11:50	02:12:28
RTC-0	02:12:49	02:13:27
SC-1	02:15:00	02:15:40
RTC-5	02:22:00	02:22:40
RTC-5	02:27:00	02:27:40
RTC-5	02:33:00	02:33:40
RTC-5	02:43:00	02:43:40
RTC-5	02:48:00	02:48:40
RTC-0	03:15:00	03:15:41
RTC-3	03:16:01	03:16:40
RTC-0	05:05:10	05:05:50
RTC-0	05:06:11	05:06:50
RTC-3	05:12:00	05:12:40
RTC-0	05:50:00	05:50:40
RTC-2	05:52:00	05:52:40

<sup>a</sup>Complete list of spacecraft ground commands may be found in Ref. 4. Definitions of commands used herein are:  
 RTC-0: clear command  
 RTC-2: antenna hinge angle override  
 RTC-3: antenna switchover  
 RTC-5: telemetry mode change  
 SC-1: midcourse maneuver roll duration

<sup>b</sup>Verification by the station read-write-verify (RWV) system.  
 Note: Above data taken from mission station reports.

For the period 23/21:14:37 to 24/07:22:00 a total of 428 C-2 doppler data points, and 960 hour angle/declination data points were received at JPL. Of this number 377 doppler and 719 hour angle/declination points were used in computing the spacecraft orbit. The remainder were rejected because of bad teletypewriter format, bad data condition code, or they were blunder points. Angular residuals seen in Appendix D show the effect of the new angular correction coefficients. The pointing error in both hour angle and declination has been reduced to approximately  $\pm 0.02$  deg. Two-way doppler residuals during the period 24/02:08 to 24/05:04 originally showed a negative bias of approximately  $-0.2$  cycles/sec which could not be accounted for. In a subsequent discussion with T. W. Hamilton, it was discovered

that the doppler portion of the ODP was not properly updating the transmitter VCO frequency. A plot of the psuedo two-way doppler residuals may be seen in Fig. D-11. Psuedo two-way doppler are not used in the ODP since more accurate two-way doppler data are available.

*Ranger 4* was the first mission for which DSIF 5 had two-way doppler capabilities; hence, the following comments are of particular interest. A least-squares technique was used to determine the quality of the raw C-2 doppler data, i.e., the doppler data from the incoming data tape. Results of the analysis showed that the quality of data, taken during the transponder tracking period, was excellent with a standard deviation of 0.067 cps. This compared very well with the standard deviation of 0.078 cps computed by a different method in the ODP. The difference between these two values is most probably caused by handling the data in hourly blocks (in the least-squares method), and by using slightly different rejection criteria. A study of the first pass transmitter VCO frequency history revealed that the oscillator was very stable; i.e., the frequency drift was well within the specification of 1 part in  $10^8$  per 15 min. The VCO frequencies during two-way tracking period may be seen in Table E-2.

On the second view period, the beacon signal was acquired at 21:21:35 on April 24, 1962. During the pass, the receiver was periodically dropping out of lock because of low signal level. AGC level ranged between  $-141$  dbm and threshold. An unsuccessful search for the transponder signal was made between 06:20:00 and 06:50:00 on April 25. The tracking period terminated when the spacecraft went below the station horizon at 09:24:11. Angular residuals for the pass were relatively large (as great as  $\pm 0.08$  degrees) and some scatter, due to low signal strength, was observed. Data taken during this, and the subsequent pass, were not used in the ODP; therefore the large errors did not affect the computed orbit.

The beacon signal was acquired on the third view period at 21:40:13 on April 25, 1962. Three unsuccessful, 30-min searches for the transponder were made at 23:08:00, 03:03:00, and 07:00:30. Throughout the pass, the receiver was periodically dropping out of lock because of low signal strength. AGC readings ranged from  $-147$  dbm to threshold. Tracking was terminated at 09:32:08 on April 26, 1962. This concluded DSIF 5 participation in the *Ranger 4* mission. Using C-1 doppler data taken during this pass, the capsule beacon frequency drift was estimated to be 1.54 cycles/min.

### III. FINAL ORBIT

Table 3. Summary of data used in orbit determination (see Ref. 1)

Station	Data types	Points received	Points used	Bad format rejection	Blunder points	Bad data condition
		Percent of received	Percent of received	Percent of received	Percent of received	Percent of received
DSIF 1 MOBILE TRACKING STATION	2-way	881	703	39	2	137
	doppler	100	79.8	4.4	0.2	15.6
DSIF 4 WOOMERA	Hour Angle,	87	35	15	2	35
	Declination	100	40.2	17.2	2.3	40.2
DSIF 5 JO'BURG	2-way	428	377	14	11	26
	doppler	100	88.0	3.3	2.6	6.1
	Hour Angle,	960	719	29	53	159
	Declination	100	74.9	3.0	5.5	16.6

The final orbit of the *Ranger 4* spacecraft was determined from the DSIF transponder data only. Data types included two-way doppler, and angular tracking data taken in either GM-1, GM-2, or GM-3. Prior to use in the ODP, the angular data was corrected for the known antenna pointing error which was determined from optical star tracks and inflight data taken during *Ranger 3*. Coefficients describing the error may be seen in Appendix C. A summary of the data used in the final orbit determination, by station and type, is given in Table 3. Both the computed root-mean-squared noise (RMS) and the mean of the residuals for each station is given in Table 4.

The JPL *Ranger* orbit determination program was designed to find, or converge on, the position and velocity

vectors at injection epoch which minimized the sum of the squares of the residuals (observed values minus computed values). Hence, the accuracy of the determined orbit will depend on the statistics of the tracking noise, and the statistics of all other error sources such as errors in the physical constants and/or station locations. The possible errors in the spacefixed Cartesian coordinates at reference epoch due to tracking data noise are given in Table 5. These errors or uncertainties were then mapped into the target area using the miss vector B. Conclusions were that the final orbit was accurate to within a 22-km 1-sigma circle in the B plane and 33 sec in linearized time of flight (see Ref. 1). The final orbit was verified by

Table 4. Tracking data noise statistics (see Ref. 1)

Station	Data types	No. of points	Computed rms	Computed mean
DSIF 1	2-way doppler	703	0.639 cps	-0.005 cps
DSIF 4	Hour angle	35	0.009 deg	-0.001 deg
	Declination	35	0.007 deg	-0.002 deg
DSIF 5	2-way doppler	377	0.078 cps	-0.002 cps
	Hour angle	719	0.020 deg	-0.002 deg
	Declination	719	0.012 deg	-0.002 deg

Table 5. Errors in position and velocity vectors at injection based on tracking data noise statistics only

Vector	Component	Error
Position	X	0.290 km
	Y	0.384 km
	Z	0.676 km
Velocity	°	
	X	0.648 m/sec
	Y	1.242 m/sec
	Z	2.225 m/sec

using the C-1 data taken by DSIF 3 during the occultation pass.

A complete discussion of the uncertainties due to errors in the physical constants and the miss parameters may be

found in Ref. 1. Appendix F contains a listing of the residuals (observed minus computed) upon which the above statistics were based. The converged injection conditions from the final orbit determination may be seen in the trajectory listing in Appendix D.



## APPENDIX A

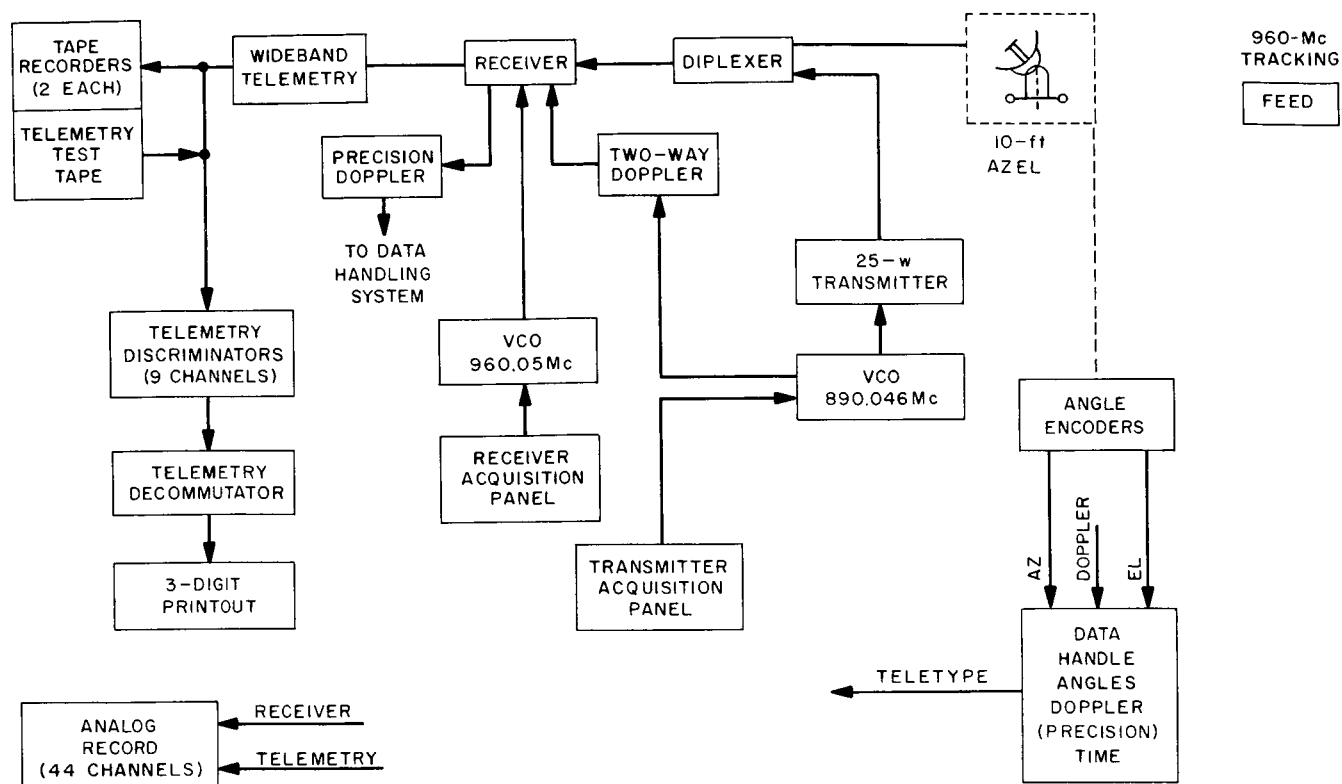
## DSIF and Spacecraft Characteristics

Table A-1. DSIF characteristics for *Ranger 4*

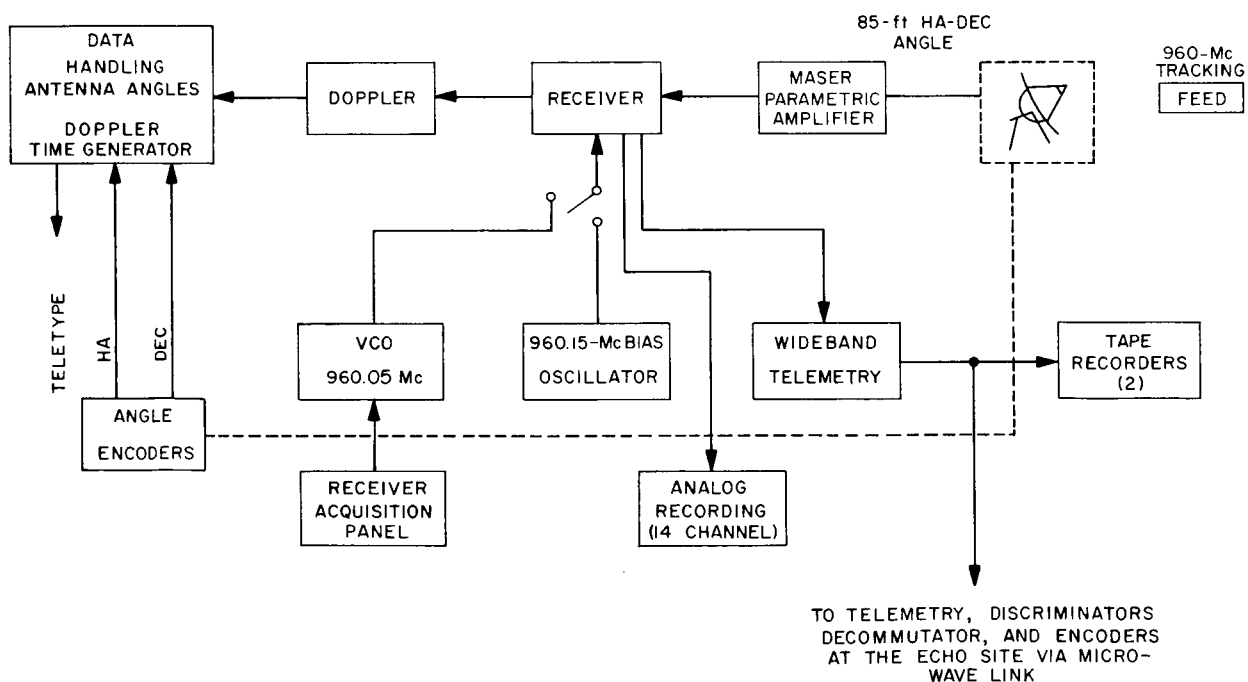
Item	DSIF 1 (Mobile tracking station)	DSIF 2 (Pioneer site, Goldstone)	DSIF 3 (Echo site, Goldstone)	DSIF 4 (Woomera)	DSIF 5 (Johannesburg)
1. Antenna type	AZ-EL	HA-DEC	AZ-EL	HA-DEC	HA-DEC
2. Antenna diameter	10 ft	85 ft	85 ft	85 ft	85 ft
3. Maximum angular rate	40 deg/sec	1 deg/sec HA 0.8 deg/sec DEC	2 deg/sec	1 deg/sec HA 0.8 deg/sec DEC	1 deg/sec HA 0.8 deg/sec DEC
4. Antenna gain (960 Mc)	22.2 db	43.5 db	43.5 db	43.5 db	43.5 db
5. Receiver noise figure	6.3 db	0.6 db	1.8 db	1.8 db	1.8 db
6. Transmitter power	25 w	—	200 w	—	200 w
7. Command capability	no	no	yes	no	yes
8. Nominal receiver frequency	960.05 Mc	960.05 Mc	960.05 Mc	960.05 Mc	960.05 Mc
9. Loop noise bandwidth at threshold	20 cps	20 cps	20 cps	20 cps	20 cps
10. Threshold	—155 dbm	—162 dbm	—162 dbm	—162 dbm	—162 dbm
11. Maximum input signal level	—45 dbm	—65 dbm	—65 dbm	—65 dbm	—65 dbm
12. Doppler resolution					
a. Two-way	0.17 m/sec	—	0.17 m/sec	—	0.17 m/sec
b. Pseudo two-way	—	10 m/sec	—	—	—
c. One-way	0.34 m/sec	10 m/sec	0.34 m/sec	10 m/sec	0.34 m/sec
13. Data transmission					
a. Angles-doppler	real time	real time	real time	real time	real time
b. Engineering telemetry	near real time	none	near real time	none	near real time
14. Recorded telemetry	yes	yes	yes	yes	yes

Table A-2. Doppler reference frequencies used at the DSIF stations

DSIF station	Reference frequency
1	One-way operation: 31.0050 Mc <sup>a</sup> Two-way operation: see footnote b
2	31.0100 Mc <sup>c</sup>
3	One-way operation: 31.0050 Mc <sup>a</sup> Two-way operation: see footnote b
4	31.0100 Mc <sup>c</sup>
5	One-way operation: 31.0050 Mc <sup>a</sup> Two-way operation: see footnote b
<sup>a</sup> Obtained in the receiver using 31.0000 Mc from the Gertsch frequency multiplier and the 5.0 kc bias frequency. <sup>b</sup> The reference frequency is obtained from the transmitter VCO and the 3.33 kc bias frequency. <sup>c</sup> Obtained from the Gertsch frequency multiplier.	



**Fig. A-1. Mobile tracking station (DSIF 1)**



**Fig. A-2. Goldstone Pioneer Site (DSIF 2)**

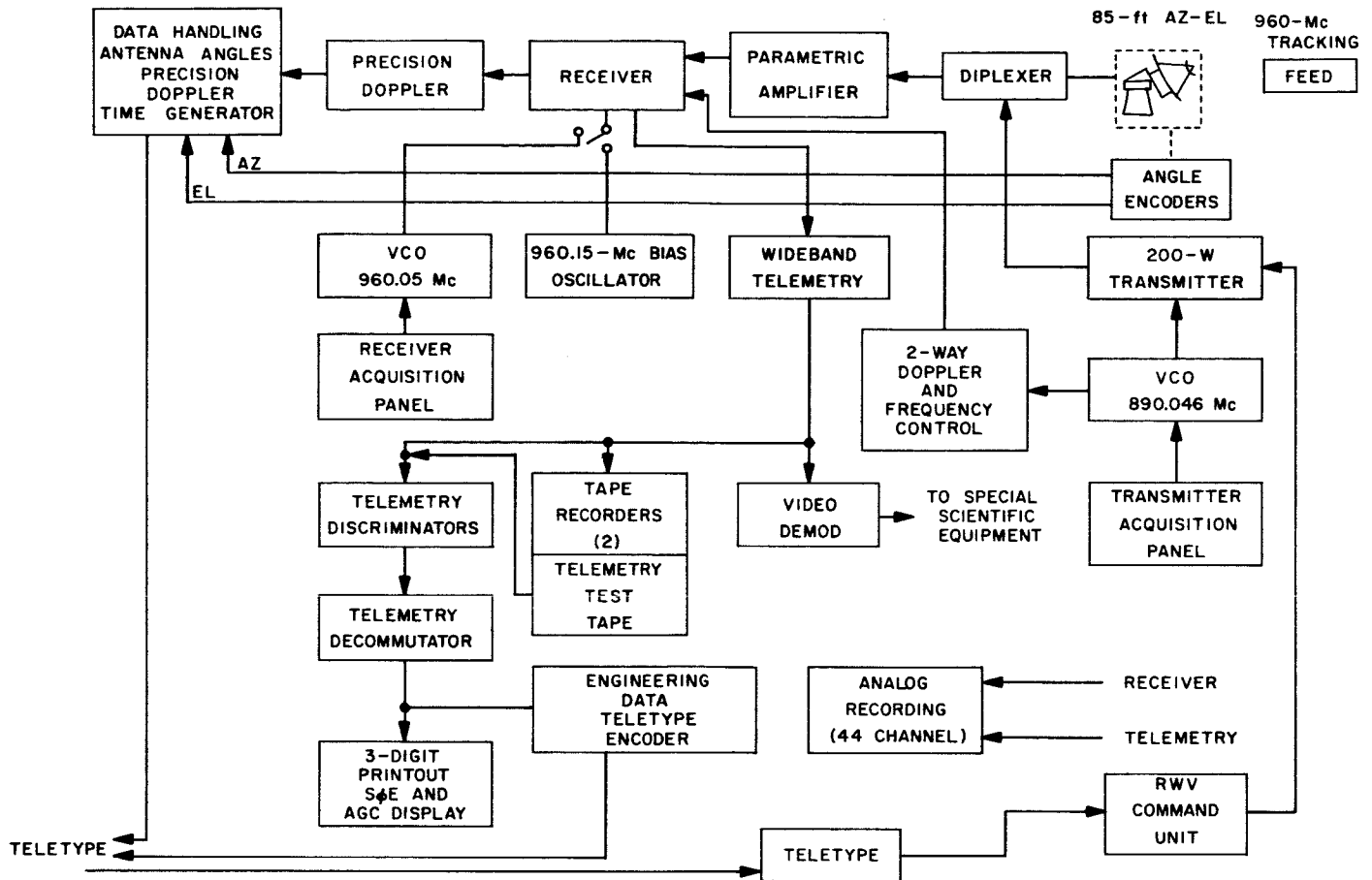


Fig. A-3. Goldstone Echo Site (DSIF 3)

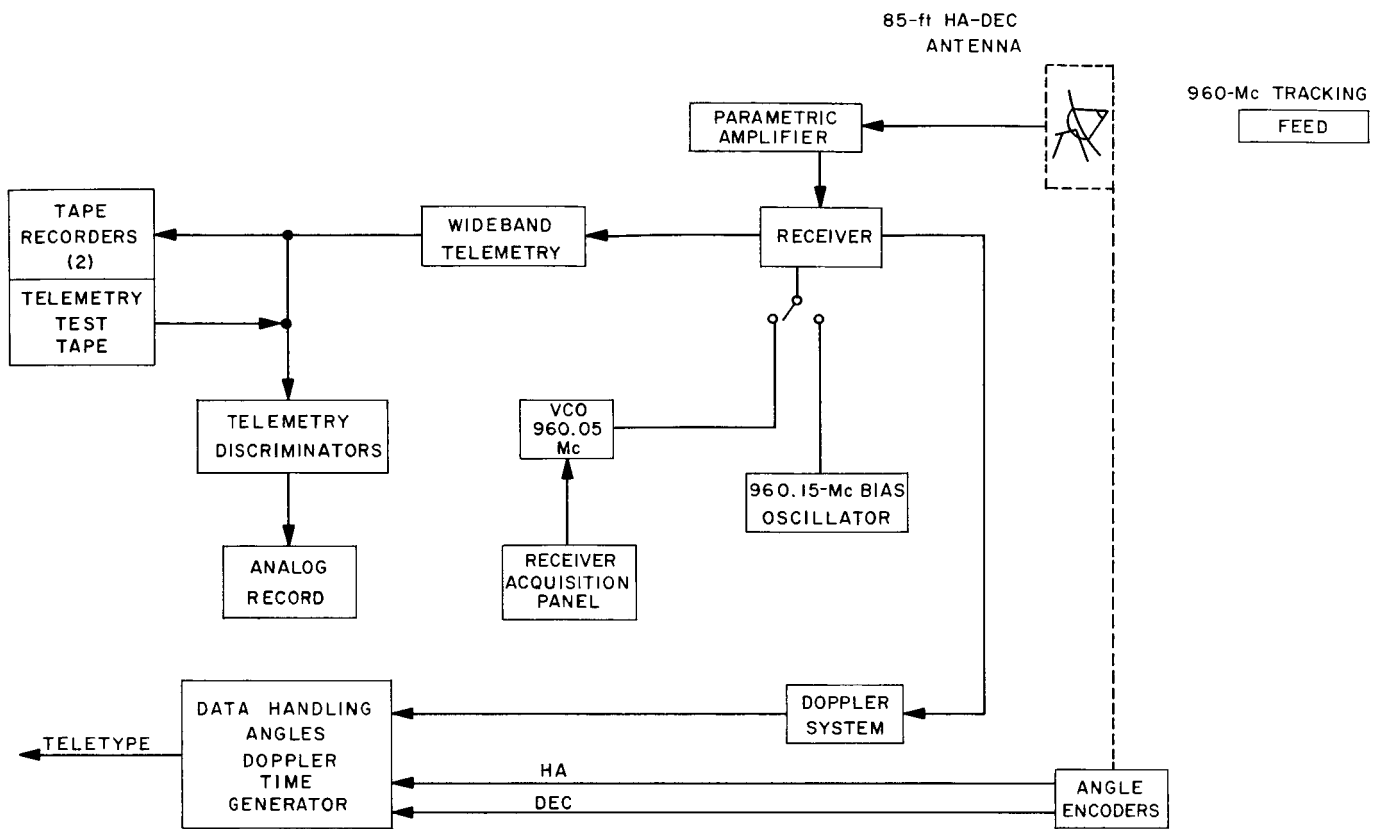


Fig. A-4. Woomera tracking station (DSIF 4)

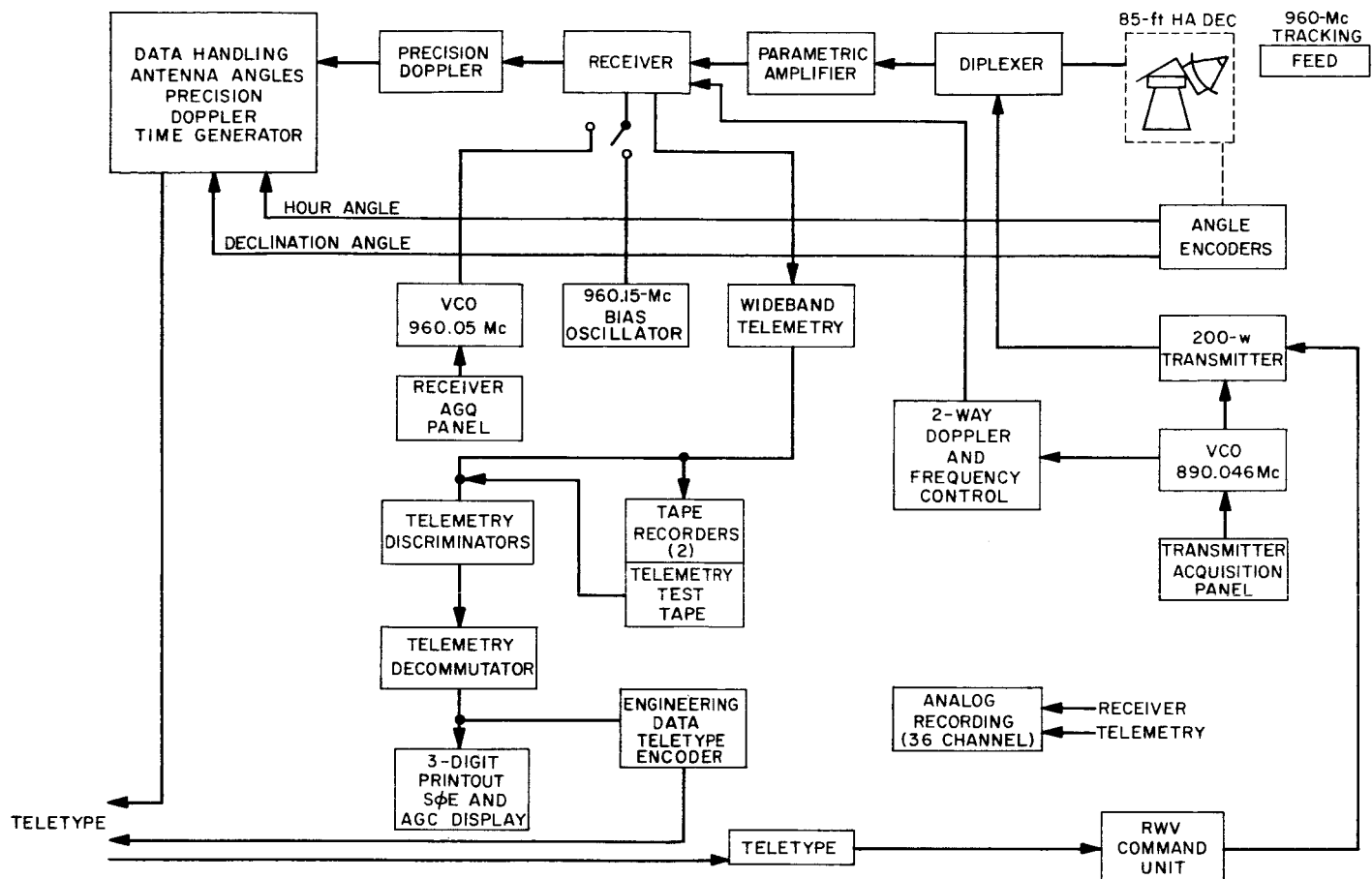


Fig. A-5. Johannesburg tracking station (DSIF 5)

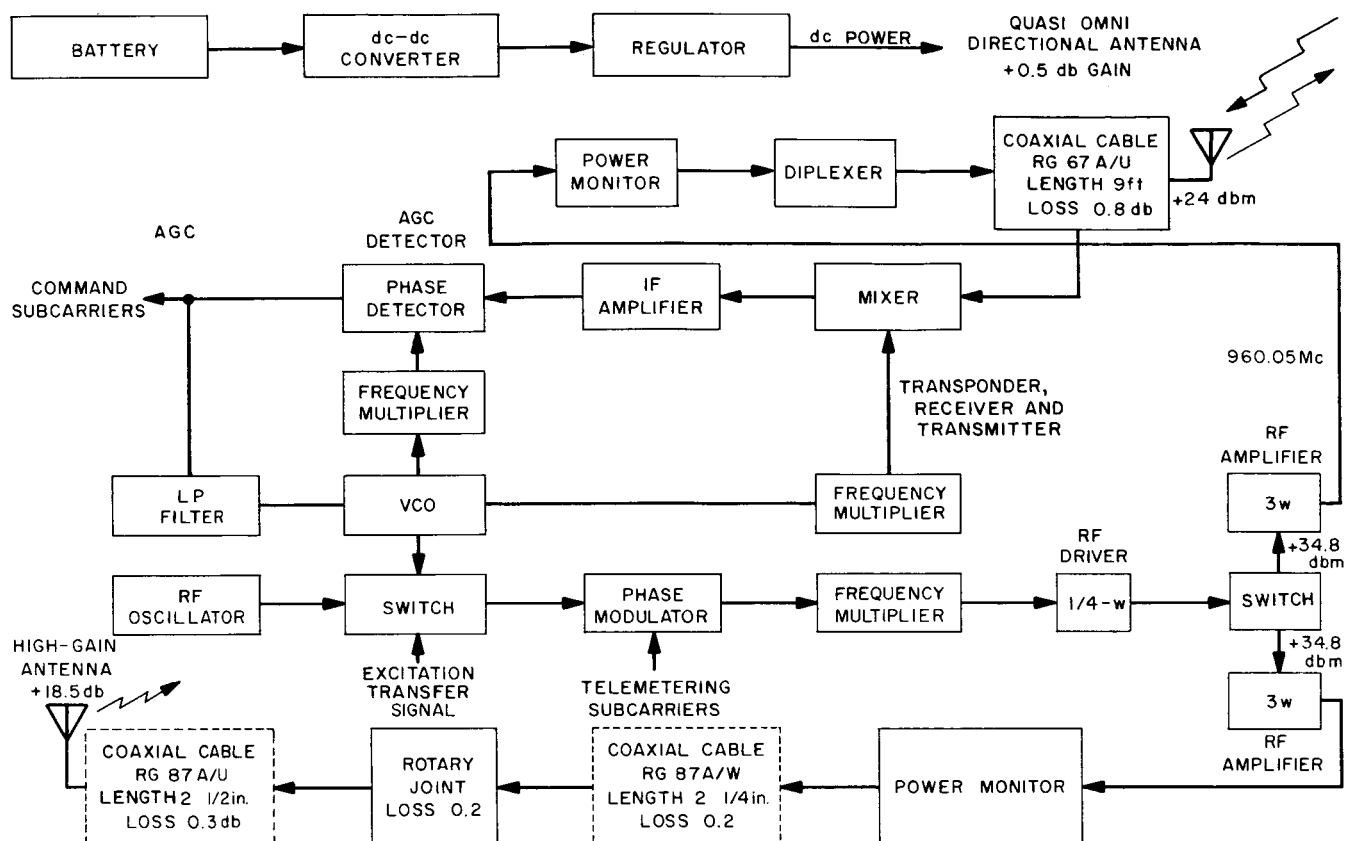


Fig. A-6. Spacecraft communications system

## APPENDIX B

## Equations Used in Data Evaluation

The following equations, by T. W. Hamilton, are used for in-flight evaluation of the two-way doppler data:

$$\sigma^2 \text{ (2-way doppler)} = (0.40)^2 \frac{10}{T_s} + \frac{1}{3} \left( \frac{1}{T_c} \right)^2 + \left( \frac{R}{4 \times 10^5} \right)^2 \left( \frac{10}{T_s} \right) (g^2)$$

where

$g^2$  = doppler system figure of merit

$R$  = slant range of spacecraft in km

$T_c$  = doppler averaging time

$T_s$  = sample interval

The first term on the right is an estimate of the variance due to gaining or losing a cycle in either the ground receiver or the spacecraft receiver in a random fashion due to noise, and noise on the signal due to the transmission medium. The second term is an estimate of the variance due to doppler counter round-off, and the third term is the variance due to transmitter reference oscillator drift. The equation used to compute  $g^2$  is given by:

$$g^2 = K \Sigma (\Delta f_r)^2$$

where

$$K = \frac{1}{T_{tot} (f_r)^2 B^*}$$

$$B^* = 1.4 \times 10^{-18} \text{ sec}^{-1}$$

$f_r$  = transmitter VCO frequency

$T_{tot}$  = time interval over which  $\Sigma (\Delta f_r)^2$  is determined

The following equations relate the received frequency, the frequency transmitted from the spacecraft, the doppler shift, and the receiver VCO frequencies.

## Definition of symbols

$f_{RC}$  = received frequency

$f_t$  = spacecraft transmitted frequency

$v$  = radial velocity component.  $v_1$  spacecraft to DSIF station.  $v_2$  DSIF station to spacecraft

$c$  = speed of light

$\left( 1 \pm \frac{v_1}{c} \right)$  = doppler term, spacecraft to DSIF station

$\left( 1 \pm \frac{v_2}{c} \right)$  = doppler term, DSIF station to spacecraft

$f_v$  = receiver 31 mc VCO frequency

$f_R$  = transmitter 29.66 mc VCO frequency

$f_1$  = 30.5565 mc bias oscillator frequency

$f_2$  = 455 kc oscillator frequency (0.455 Mc)

## For DSIF 1

One-way transponder tracking at 960.05 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v_1}{c} \right)$$

$$f_{RC} = 30f_v + \frac{30}{29 \frac{2}{3}} f_R$$

$$\therefore f_t \left( 1 \pm \frac{v_1}{c} \right) = 30f_v + \frac{30}{29 \frac{2}{3}} f_R$$

Two-way transponder tracking at 960.05 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v_1}{c} \right) = 30f_v + \frac{30}{29 \frac{2}{3}} f_R$$

$$f_t = \frac{32}{29 \frac{2}{3}} 30f_v \left( 1 \pm \frac{v_2}{c} \right)$$

assume  $v_1 = v_2$ , then

$$\left(1 \pm \frac{v}{c}\right)^2 \simeq \left(1 \pm \frac{2v}{c}\right)$$

and

$$f_r = \frac{f_R}{29 \cdot 2/3} \left[ 31 - 32 \left( \frac{2v}{c} \right) \right]$$

Pseudo two-way transponder tracking at 960.05 Mc with DSIF 3 or DSIF 5 transmitting:

$$f_{RC} = f_t \left( 1 \pm \frac{v_1}{c} \right) = 30f_r + \frac{30}{29 \cdot 2/3} f_{R_1}$$

$$f_t = 30f_{R_2} \left( 1 \pm \frac{v_2}{c} \right) \frac{32}{29 \cdot 2/3}$$

where

$f_{R_2}$  = the transmitter VCO frequency of

DSIF 3 or DSIF 5, then,

$$\frac{32}{29 \cdot 2/3} f_{R_2} \left( 1 \pm \frac{v_1}{c} \pm \frac{v_2}{c} \right) = \frac{f_{R_1}}{29 \cdot 2/3} + f_r$$

For DSIF 2 and DSIF 4

One-way transponder tracking at 960.05 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v}{c} \right) = \frac{960}{31} f_v$$

Pseudo two-way transponder tracking at 960.05 Mc:

$$f_{RC} = f_v \left( 1 \pm \frac{v_1}{c} \right) = \frac{960}{31} f_r$$

$$f_t = \frac{32}{29 \cdot 2/3} 30f_{R_2} \left( 1 \pm \frac{v_2}{c} \right)$$

Then,

$$\frac{32}{29 \cdot 2/3} f_{R_2} \left( 1 \pm \frac{v_1}{c} \pm \frac{v_2}{c} \right) = \frac{32}{31} f_v$$

where

$f_{R_2}$  = DSIF station transmitter VCO frequency

One-way capsule tracking at 960.25 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v_1}{c} \right) = 30f_v + f_m$$

$$f_m = f_1 - f_2$$

then,

$$f_{RC} = 30f_v + f_1 - f_2$$

For DSIF 3 and DSIF 5.

One-way transponder tracking at 960.05 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v}{c} \right) = \frac{960}{31} f_r$$

Two-way transponder tracking at 960.05 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v}{c} \right) = 30f_r + \frac{30}{29 \cdot 2/3} f_R$$

$$f_t = \frac{32}{29 \cdot 2/3} 30f_R \left( 1 \pm \frac{v}{c} \right)$$

assume

$v_1 = v_2$  then,

$$\left( 1 \pm \frac{v}{c} \right) \simeq \left( 1 \pm \frac{2v}{c} \right)$$

and

$$f_r = \frac{f_R}{29 \cdot 2/3} \left[ 31 - 32 \left( \frac{2v}{c} \right) \right]$$

One-way capsule tracking at 960.25 Mc:

$$f_{RC} = f_t \left( 1 \pm \frac{v}{c} \right) = 30f_v + f_m$$

$$f_m = f_1 - f_2$$

then,

$$f_{RC} = 30f_v + f_1 - f_2$$

The following form of the autocorrelation function is used to determine whether the tracking data noise is of a random nature.

$$\rho(k) = \frac{1}{(N-K) \rho(0)} \sum_{i=1}^{N-k} r_i r_{i+k}, \quad k = 1, 2, \dots, (2/3 N)$$

where

$r_i$  = the  $i$ th residual

$N$  = the total number of data points used

$(2/3 N)$  = the largest integer in  $2/3 N$

$K$  = a dummy index related to time; i.e.,

$t_k = (t_0 + k \Delta t)$ , where  $\Delta t$  is the sample interval

$\rho(k)$  = the autocorrelation coefficient of the  $k$ th order



## APPENDIX C

## Results of Ranger 4 Preflight Calibration Tests

Table C-1 presents coefficients of polynomial representing optical pointing error—used to correct angular data for *in-flight* orbit computations.

Table C-1. Coefficients for optical pointing error

Hour angle coefficients	Declination coefficients
DSIF 4	
$A_{00} = 8.55001840-03$	$B_{00} = 1.34309100-02$
$A_{01} = 5.45289422-04$	$B_{01} = 1.34214922-04$
$A_{02} = 2.48249580-06$	$B_{02} = -1.41108901-05$
$A_{03} = 2.24566914-07$	$B_{03} = 0.0$
$A_{10} = 4.27132878-04$	$B_{10} = -4.31028233-04$
$A_{11} = 8.69584098-06$	$B_{11} = 3.34771543-06$
$A_{12} = -6.52073317-07$	$B_{12} = 1.01895206-07$
$A_{13} = -1.59490382-08$	$B_{13} = 0.0$
$A_{20} = 2.53268802-06$	$B_{20} = -9.56363999-06$
$A_{21} = -7.89511508-08$	$B_{21} = 4.53942058-09$
$A_{22} = -7.04116079-09$	$B_{22} = 2.09578021-09$
$A_{23} = -1.23595449-10$	$B_{23} = 0.0$
$A_{30} = -8.38262784-08$	$B_{30} = 0.0$
$A_{31} = 1.90513748-09$	$B_{31} = 0.0$
$A_{32} = 3.95248319-10$	$B_{32} = 0.0$
$A_{33} = 9.57751208-12$	$B_{33} = 0.0$
The useful range of these functions is $-80^\circ \leq \alpha \leq +80^\circ, -35^\circ \leq \delta \leq +35^\circ$	
DSIF 5	
$A_{00} = 9.14878200-03$	$B_{00} = 2.9860570-02$
$A_{01} = 1.58528433-04$	$B_{01} = 1.04434590-04$
$A_{02} = 6.24530962-06$	$B_{02} = -3.64955790-06$
$A_{03} = 3.43842729-07$	$B_{03} = 2.01838820-07$
$A_{10} = 3.95889511-04$	$B_{10} = 7.39376711-05$
$A_{11} = 9.36369950-06$	$B_{11} = 4.55037975-06$
$A_{12} = -3.41913978-07$	$B_{12} = -9.45727640-08$
$A_{13} = -3.76659061-09$	$B_{13} = -7.12650861-09$
$A_{20} = 4.31922333-06$	$B_{20} = -9.21918567-06$
$A_{21} = -1.03537453-08$	$B_{21} = 5.89778738-08$
$A_{22} = -3.04187273-09$	$B_{22} = 3.62801844-09$
$A_{23} = -1.52368370-11$	$B_{23} = -5.16572982-11$
$A_{30} = 4.82683978-08$	$B_{30} = 0.0$
$A_{31} = 6.22459846-10$	$B_{31} = 0.0$
$A_{32} = 1.79924034-10$	$B_{32} = 0.0$
$A_{33} = 3.31402952-12$	$B_{33} = 0.0$
The useful range of these functions is $-80^\circ \leq \alpha \leq 80^\circ, -35^\circ \leq \delta \leq +35^\circ$	

Table C-2 presents coefficients of polynomial representing both optical star tracks and postflight analysis of *Ranger 3* and *4*. These coefficients were used for *Ranger 4* *postflight* orbit computations.

Table C-2. Coefficients for optical star tracks and postflight analysis

Hour angle coefficients	Declination coefficients
DSIF 4	
$A_{00} = 4.87852874-02$	$B_{00} = 5.05083350-02$
$A_{01} = 5.45289422-04$	$B_{01} = 1.34214922-04$
$A_{02} = 2.48249580-06$	$B_{02} = -1.41108901-05$
$A_{03} = 2.24566941-07$	$B_{03} = 0.0$
$A_{10} = 2.99712960-04$	$B_{10} = -3.23836883-04$
$A_{11} = 8.69584098-06$	$B_{11} = 3.34771543-06$
$A_{12} = -6.52074417-07$	$B_{12} = 1.01895206-07$
$A_{13} = -1.59490382-08$	$B_{13} = 0.0$
$A_{20} = -3.54187980-07$	$B_{20} = -1.32446178-05$
$A_{21} = -7.89511508-08$	$B_{21} = 4.53942058-09$
$A_{22} = -7.04116079-09$	$B_{22} = 2.09578021-09$
$A_{23} = -1.23595449-10$	$B_{23} = 0.0$
$A_{30} = -1.78866862-07$	$B_{30} = 0.0$
$A_{31} = 1.90513748-09$	$B_{31} = 0.0$
$A_{32} = 3.95248319-10$	$B_{32} = 0.0$
$A_{33} = 9.57751208-12$	$B_{33} = 0.0$
The useful range of these functions is $-80^\circ \leq \alpha \leq +80^\circ, -35^\circ \leq \delta \leq +35^\circ$	
DSIF 5	
$A_{00} = 5.66230510-02$	$B_{00} = 9.85199500-03$
$A_{01} = 1.58528433-04$	$B_{01} = 1.04434590-04$
$A_{02} = 6.24530962-06$	$B_{02} = -3.64955790-06$
$A_{03} = 3.43842729-07$	$B_{03} = 2.01838820-07$
$A_{10} = 4.36834641-04$	$B_{10} = -6.98130410-05$
$A_{11} = 9.36369950-06$	$B_{11} = 4.55037975-06$
$A_{12} = -3.41913978-07$	$B_{12} = -9.45727640-08$
$A_{13} = -3.76659061-09$	$B_{13} = -7.12650861-09$
$A_{20} = 1.03365993-06$	$B_{20} = -1.07124828-05$
$A_{21} = -1.03537453-08$	$B_{21} = 5.89773738-08$
$A_{22} = -3.04187273-09$	$B_{22} = 3.62801844-09$
$A_{23} = -1.52368379-11$	$B_{23} = -5.16572982-11$
$A_{30} = -1.58618567-07$	$B_{30} = 0.0$
$A_{31} = 6.22450846-10$	$B_{31} = 0.0$
$A_{32} = 1.79924034-10$	$B_{32} = 0.0$
$A_{33} = 3.31402952-12$	$B_{33} = 0.0$
The useful range of these functions is $-80^\circ \leq \alpha \leq +80^\circ, -35^\circ \leq \delta \leq +35^\circ$	

Results of the *Ranger 4* preflight boresight-vs-polarization-angle test are presented in Table C-3.

**Table C-3. *Ranger 4* preflight boresight-vs-polarization-angle test**

DSIF station	Signal level, dbm	Mean values of residuals in AZ/HA, deg	Standard deviation of residuals in AZ/HA, deg	Mean value of residuals in EL/DEC, deg	Standard deviation of residuals in EL/DEC, deg
1	100	-0.013	0.068	-0.007	0.057
	110	-0.014	0.069	-0.008	0.056
	120	-0.013	0.069	-0.004	0.058
	130	0.005	0.066	0.009	0.065
3	120	0.004	0.003	0.016	0.002
	125	0.006	0.002	0.015	0.003
	130	0.005	0.002	0.015	0.004
	135	0.005	0.003	0.016	0.003
	140	0.008	0.004	0.016	0.007
	145	0.008	0.007	0.015	0.009
	150	0.017	0.006	0.018	0.007
4	120	0.033	0.011	0.048	0.004
	125	-0.020	0.000	-0.056	0.000
	130	-0.029	-0.031	-0.053	0.016
	135	-0.020	0.000	-0.056	0.000
	140	-0.018	-0.006	-0.016	0.065
	145	-0.020	0.000	-0.056	0.000
	150	-0.019	-0.003	-0.017	0.065
5	120	-0.017	0.011	-0.010	0.015
	125	-0.019	0.012	-0.007	0.005
	130	-0.014	0.018	-0.005	0.008
	135	-0.010	0.025	-0.008	0.017
	140	-0.013	0.037	-0.007	0.022
	145	-0.016	0.050	-0.006	0.031
	150	-0.030	0.083	-0.003	0.052
Note: Residuals are defined as the difference between the optical values and the RF boresight values.					

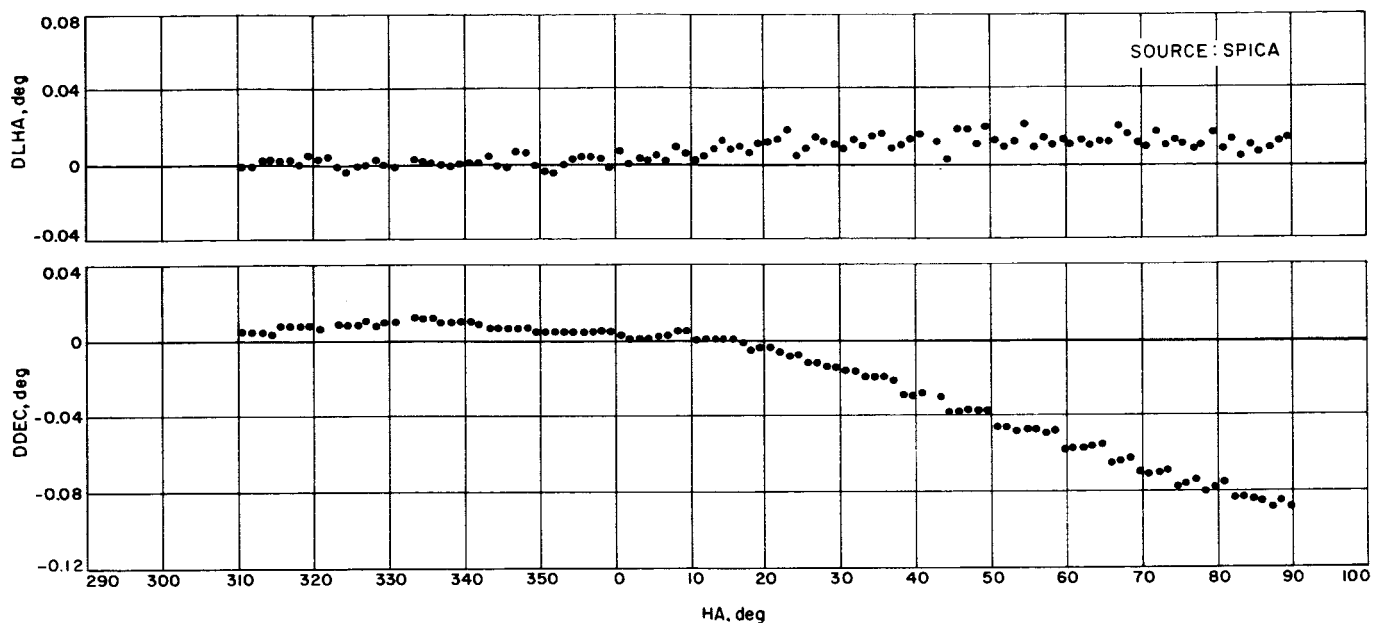


Fig. C-1. Preflight star track results, April 10, 1962 (DSIF 4)

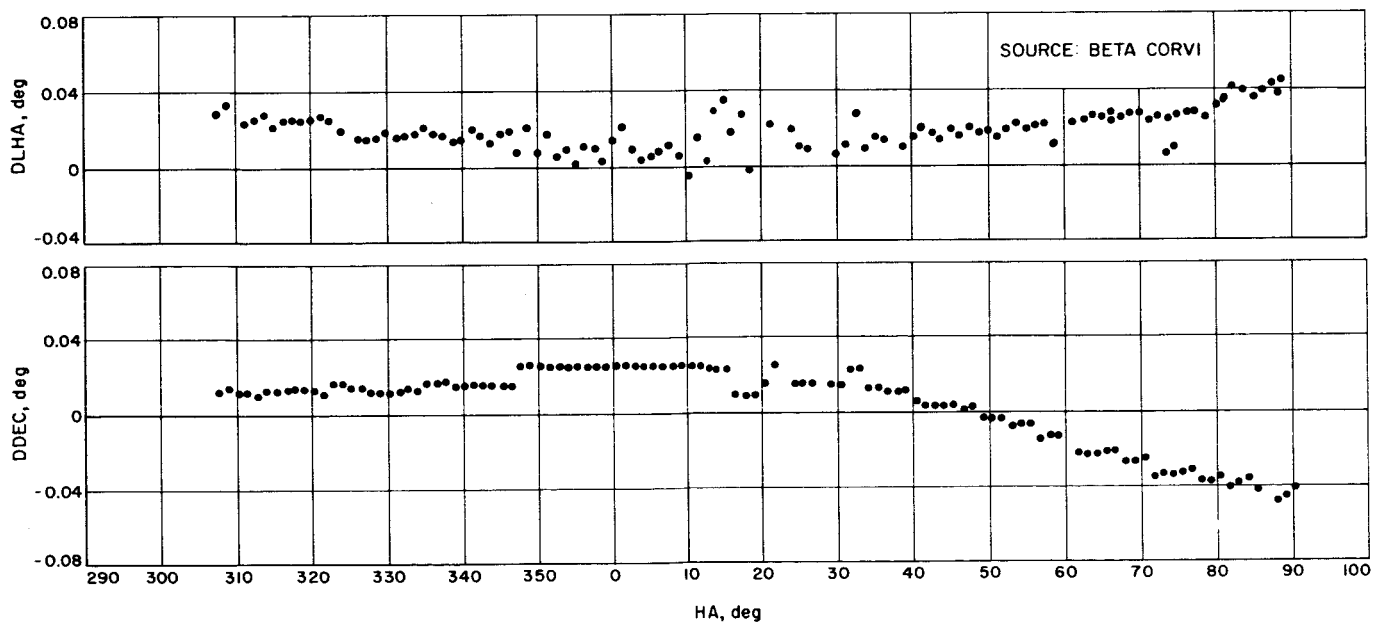


Fig. C-2. Preflight star track results, April 3, 1962 (DSIF 5)

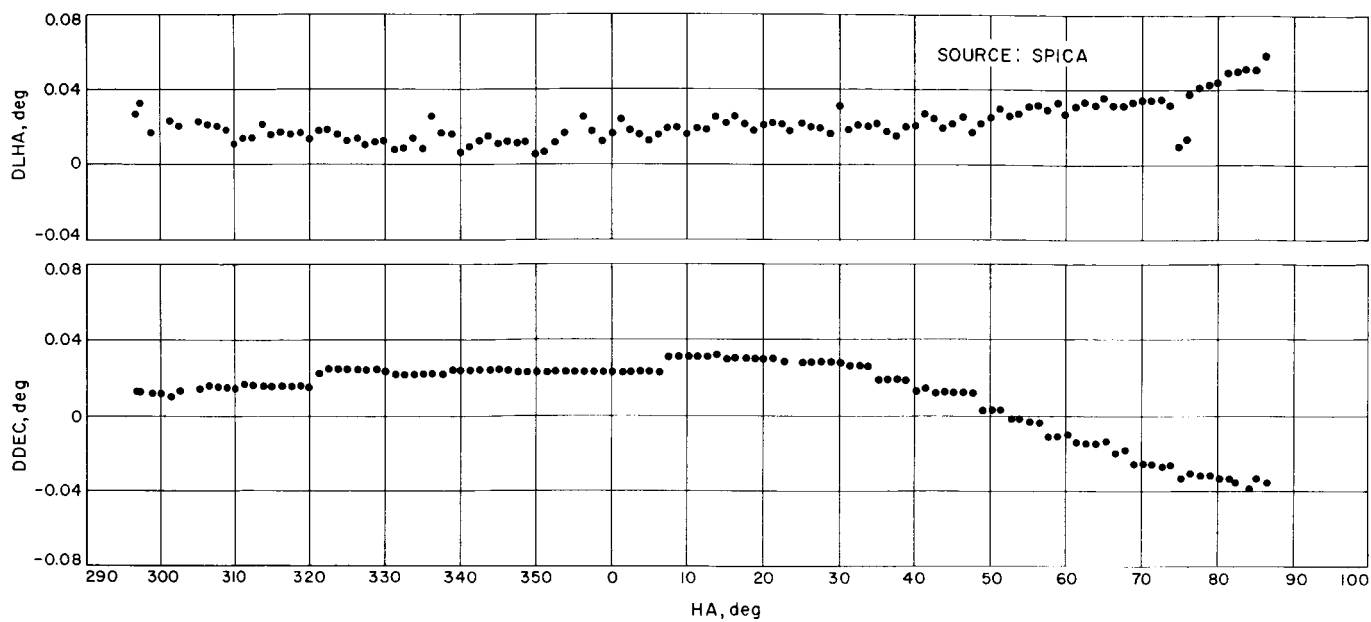


Fig. C-3. Preflight star track results, April 12, 1952 (DSIF 5)

## APPENDIX D

### Hourly Trajectory Listing From Injection to Impact

Appendix D consists of an hourly trajectory listing from injection to impact. Figures D-1 through D-11 present doppler and angular residuals.

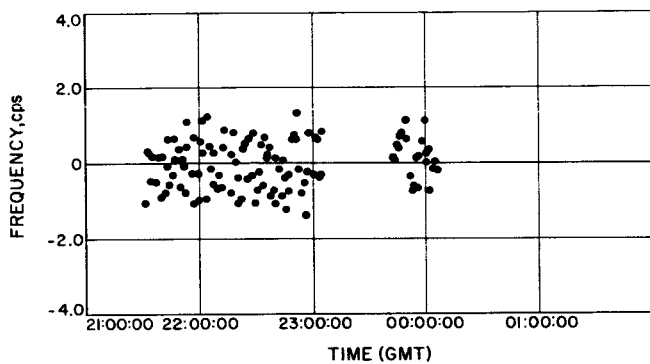


Fig. D-1. C-2 doppler residuals (DSIF 1)

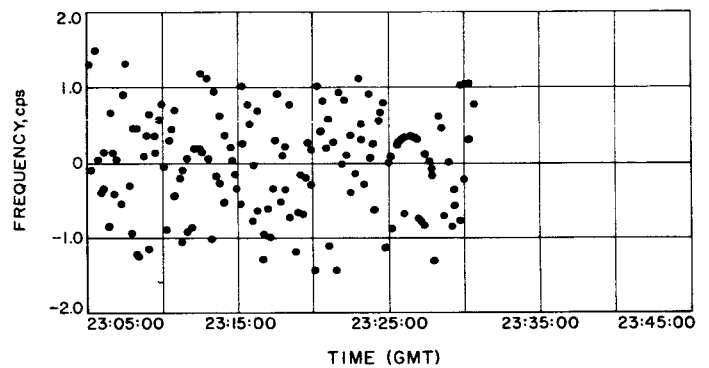


Fig. D-2. C-2 doppler truncation (DSIF 1)

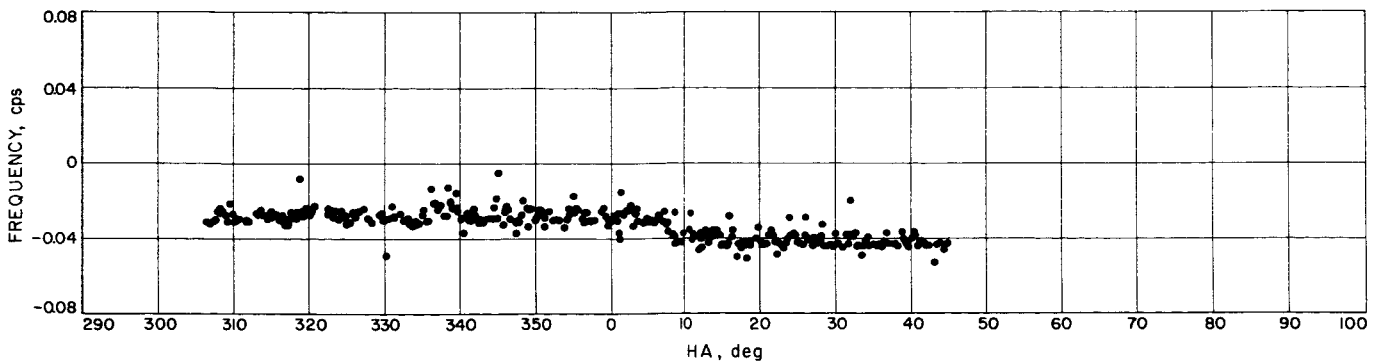


Fig. D-3. RF boresight shift (DSIF 2)

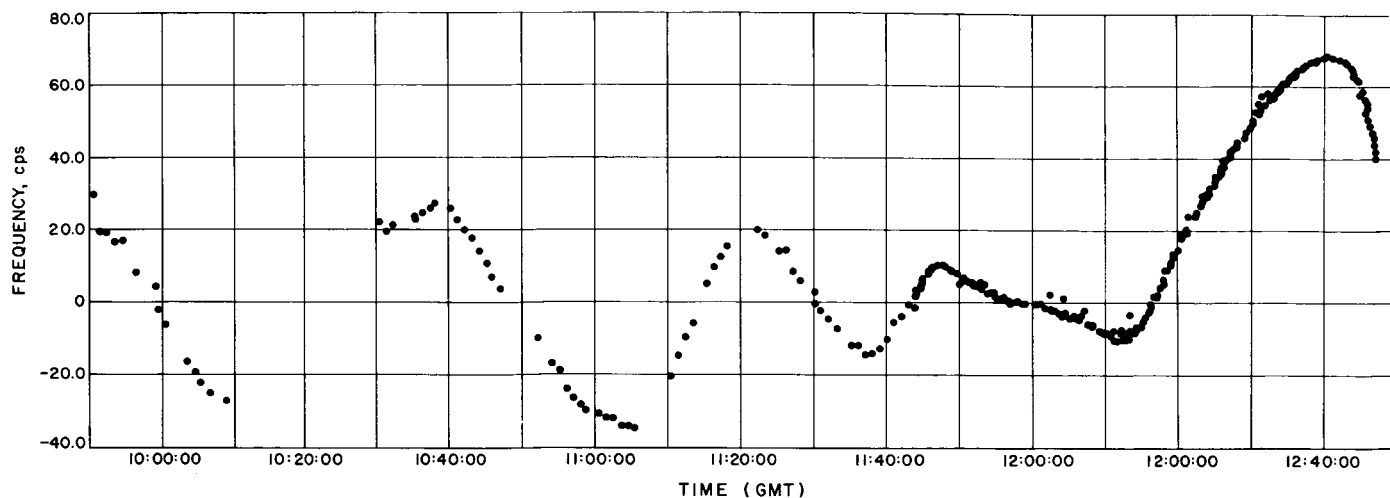


Fig. D-4. C-1 doppler residuals (DSIF 2)

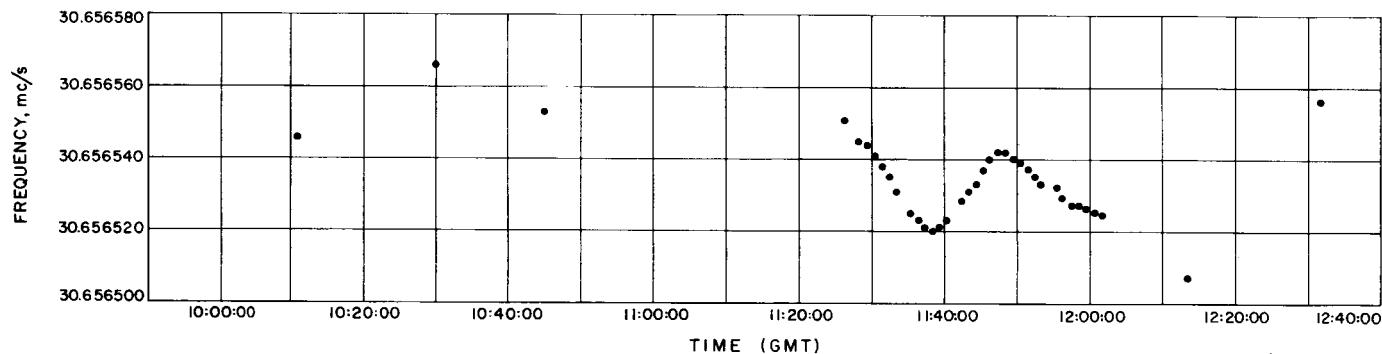


Fig. D-5. 30-Mc bias OSC frequency (DSIF 2)

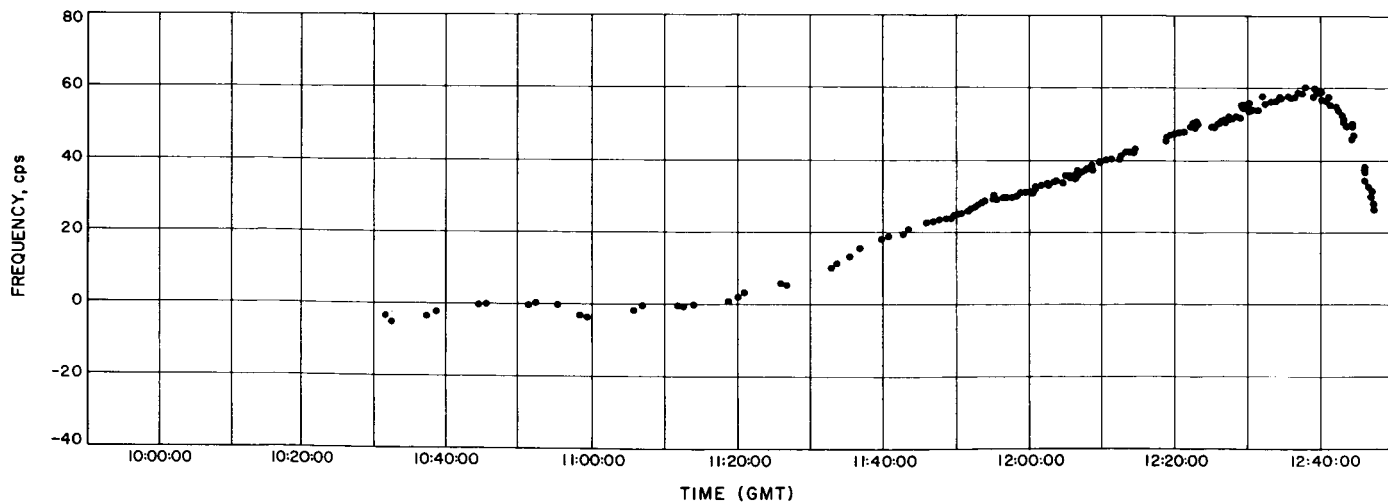
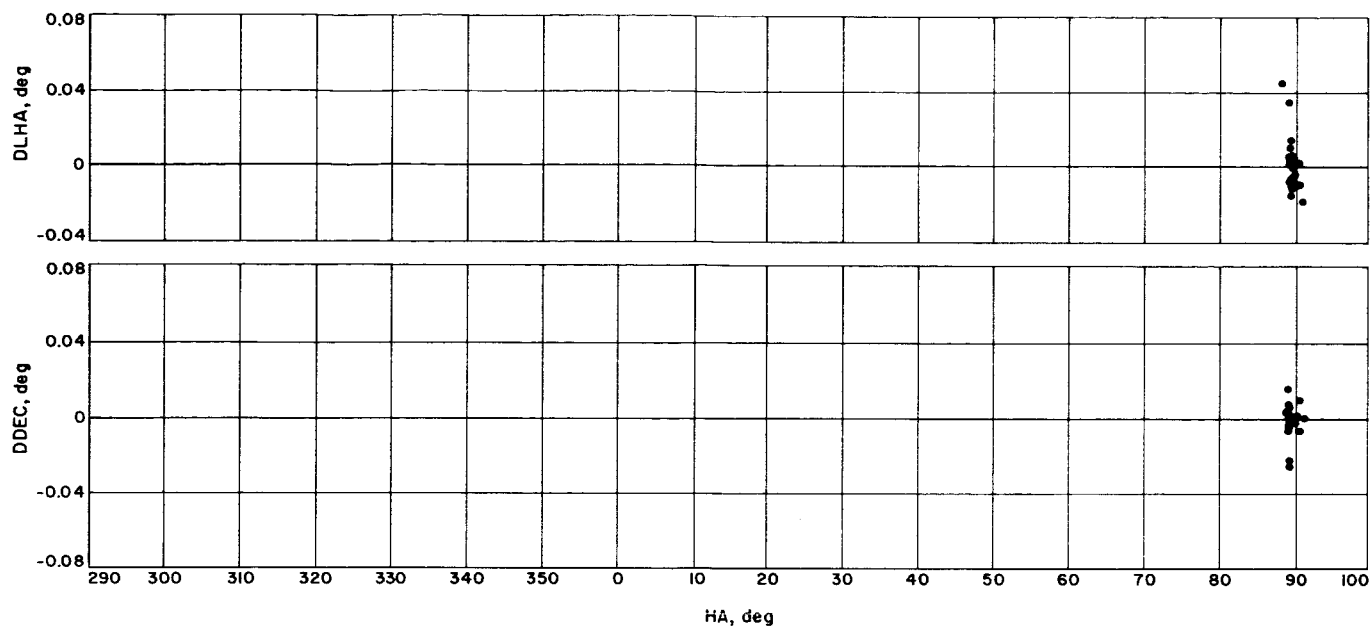
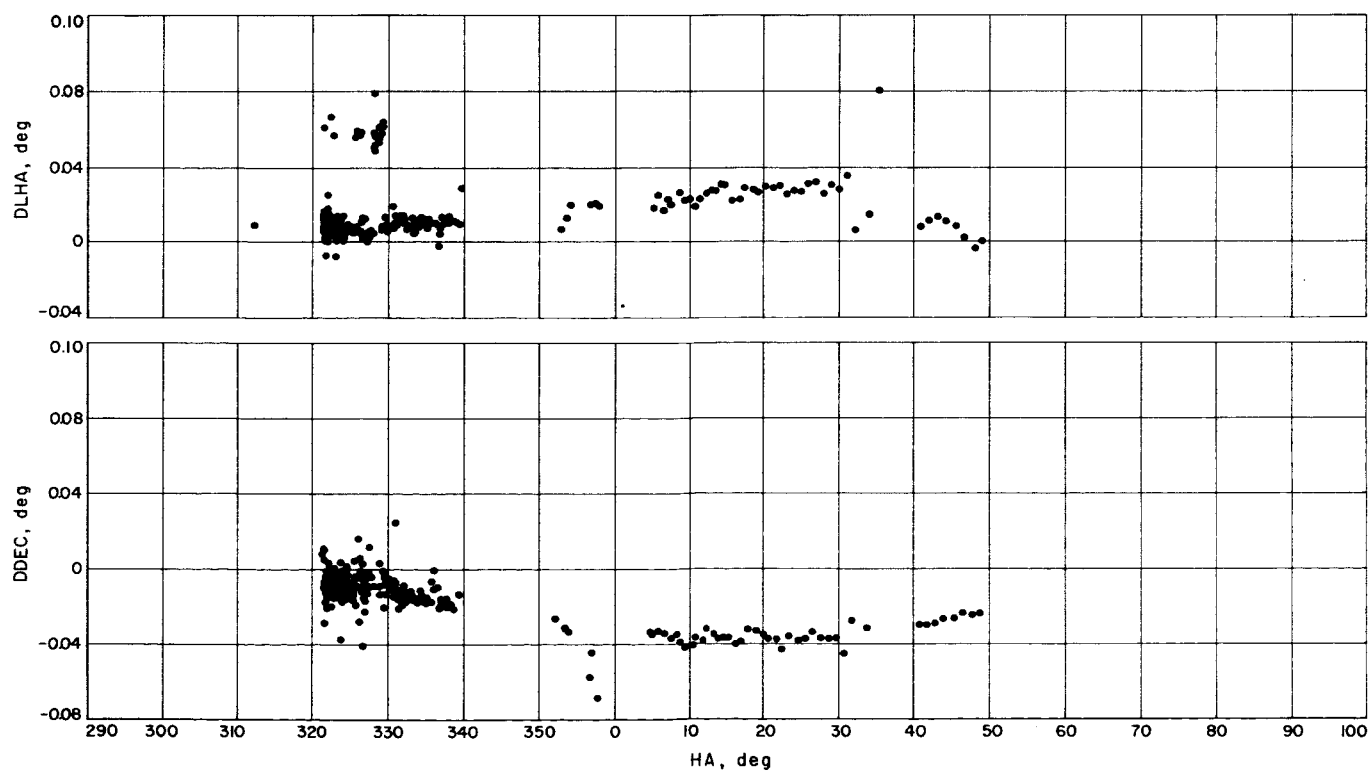


Fig. D-6. C-1 doppler residuals (DSIF 3)

**Fig. D-7. Angular residuals vs hour angle (DSIF 4)****Fig. D-8. Angular residuals vs hour angle (DSIF 5)**

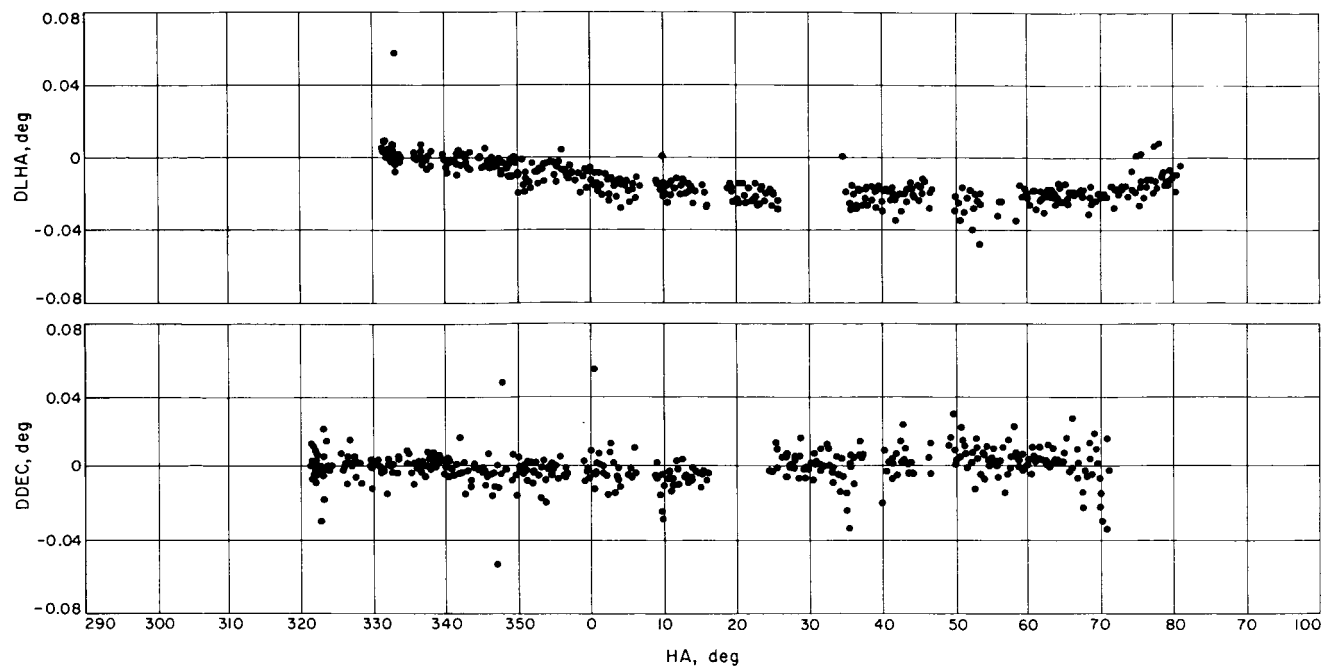


Fig. D-9. Angular residuals vs hour angle (DSIF 5)

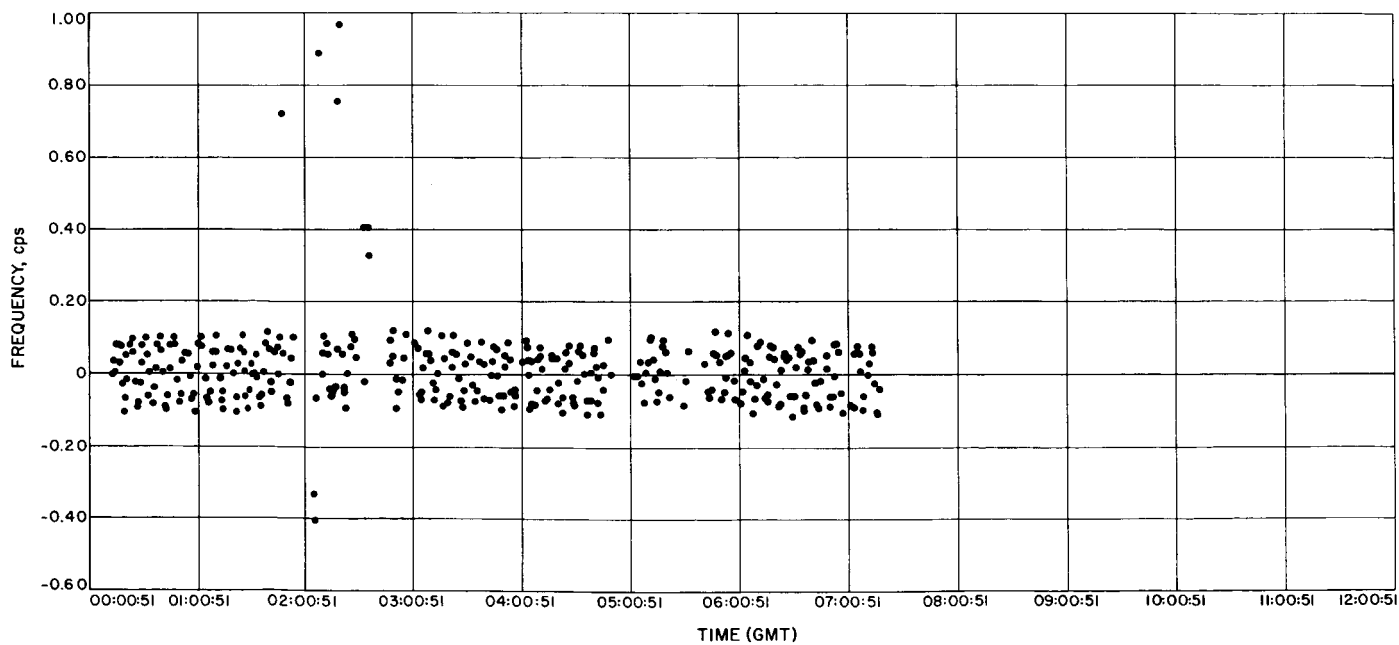


Fig. D-10. C-2 doppler residuals (DSIF 5)



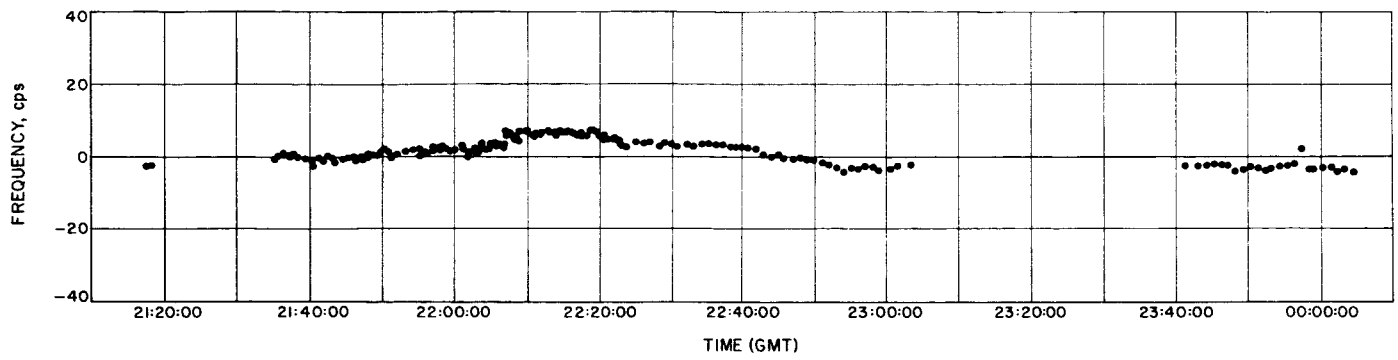


Fig. D-11. Pseudo two-way doppler residuals (DSIF 5)

1

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
EPHEMERIDES WITH VENUS VELOCITIES

BK

GME .39860320 06 J .16234500-02 H -.57499999-05 D .78749999-05 RE .63781650 04 REM .63781650 04  
G .66709998-19 A .88745998 29 B .88763998 29 C .88800998 29 DME .41780741-02 AU .14959900 09  
GMM .49007589 04 GMS .13271544 12 GMV .32476950 06 GMA .42977799 05 GMC .00000000 00 GMJ .12671060 09

INJECTION CONDITIONS 1950.0 MOON JULIAN DATE 2437778.37799768 APRIL 23, 1962 21 04 19.000

GEOCENTRIC X0-.38776202 04 Y0 .50365212 04 Z0 .16576310 04 DX0-.87162901 01 DY0-.48004703 01 DZ0-.45872097 01  
CARTESIAN GMC .00000000 00 SGC .00000000 00 TO .75859000 05 GHA .16750137 03 GHO .21055684 03

0 DAYS 0 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437778.37799768 APRIL 23, 1962 21 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X -.38930893 04 Y .50261202 04 Z .16529350 04 DX -.86979755 01 DY -.48240301 01 DZ -.45972462 01  
R .65688828 04 DEC .14574050 02 RA .12776034 03 V .10957222 02 PTH .16057194 01 AZ .11616584 03  
R .65688828 04 LAT .14574050 02 LON .32025837 03 VE .10543285 02 PTE .16687783 01 AZE .11727733 03  
XS .12585905 09 YS .75630276 08 ZS .32795152 08 DXS -.15823241 02 DYS .22958091 02 DZS .99543703 01  
XM -.81001605 05 YM -.35864251 06 ZM .12461998 06 DXM .99683747 00 DYM -.13864919 00 DZM -.11693229 00  
XT -.81001605 05 YT -.35864251 06 ZT .12461998 06 DXT .99683747 00 DYT -.13864919 00 DZT -.11693229 00  
RS .15045252 09 VS .29606391 02 RM .38822139 06 VM .10132037 01 RT .38822139 06 VT .10132037 01  
GED .14669099 02 ALT .19204352 03 LOS .22350081 03 RAS .31002181 02 RAM .25727293 03 LOM .89711561 02  
DUT .34000000 02 DT .15000000 02 DR .30703719 00 SHA .65584625 04 DES .12590225 02 DEM -.18723552 02

## GEOCENTRIC

## EQUATORIAL COORDINATES

EPOCH OF PERICENTER PASSAGE  
SMA .30654356 06 ECC .97858813 00 INC .29698774 02 JULIAN DATE 2437778.37760476 APRIL 23, 1962 21 03 45.053  
VH .11862434 00 C3 -.13003150 01 C1 .71948444 05 SLR .12986796 05 APD .60652344 06 TFP .33947350 02  
TA .32465848 01 EA .33782285 00 MA .72353677-02 DAO .15985688 02 RAD .12472946 03 MTA .18000000 03  
WX -.21032427 00 WY -.44858062 00 WZ .86864211 00 PX -.54767205 00 PY .79007062 00 PZ .27539724 00  
QX -.80982647 00 QY -.41780829 00 QZ -.41184609 00 RX -.15689440 00 RY .22633556 00 RZ -.96133046 00  
SX0 -.54767205 00 SY0 .79007062 00 SZ0 .27539724 00 TX .82185123 00 TY .56970217 00 TZ .00000000 00  
BX .80982652 00 BY .41780832 00 BZ .41184611 00 MX -.77751032 00 MY -.46188203 00 MZ -.42678176 00  
B.T .57011872 05 B.R -.27030828 05 B .63095319 05 PER .28151174 05 OMD .99809485-02 NOD -.62537497-02  
C3J -.16758699 01

0 DAYS 1 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437778.41966435

APRIL 23, 1962 22 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X -.11010599 05 Y -.17287770 05 Z -.11591394 05 DX .37217160 00 DY -.50917753 01 DZ -.25379841 01  
R .23546989 05 DEC -.29489661 02 RA .23750699 03 V .57014077 01 PTH .57595637 02 AZ .93630357 02  
R .23546989 05 LAT -.29489662 02 LON .54964454 02 VE .50621289 01 PTE .71972709 02 AZE .97093751 02  
XS .12580206 09 YS .75712909 08 ZS .32830981 08 DXS -.15840870 02 DYS .22947584 02 DZS .99498045 01  
XM -.77409567 05 YM -.35912562 06 ZM .12503537 06 DXM .99871972 00 DYM -.12974261 00 DZM -.11383935 00  
XT -.77409567 05 YT -.35912562 06 ZT .12503537 06 DXT .99871972 00 DYT -.12974261 00 DZT -.11383935 00  
RS .15045423 09 VS .29606137 02 RM .38806857 06 VM .10135253 01 RT .38806857 06 VT .10135253 01  
GED -.29656693 02 ALT .17174015 05 LOS .20849883 03 RAS .31041276 02 RAM .25783599 03 LOM .75293548 02  
DUT .34000000 02 DT .24000000 03 DR .48136251 01 SHA .11698187 05 DES .12604061 02 DEM -.18795967 02

2

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 OOMJET 1 UNIFORM TIME TAU .00000000 00  
 R .23546989 05 HA .7216622 02 DEC -.29489662 02 LONG  
 MIN .59999999 02 HA .7216622 02 DEC -.22060063 02 ELE  
 CKM .32990156 03 CKC .26024830 03 CKT .32990156 03 PSS  
 UT .10000000 01 OHA -.72260384-02 DDE -.2551576-02 DEL  
 ET .99905556 00 RGE .22070725 05 DRG .42336748 01 DDR  
 RDI .63725236 04 PHI -.31210140 02 THI .13688502 03 SPS  
 DT .73620004-01 RFI .00000000 00 RF2 .00000000 00 BFI  
 ESS1 -.10757040 03 ESS2 -.13117040 03 F1 .11471718 06 F2  
 RF .00000000 00 DDP -.65788389-06

.54964454 02  
 .54537352 01  
 .16576381 03  
 .70967950-02  
 .10272326-03  
 .16576587 03  
 .13643464 06  
 .12711568 06  
 .22221083 03

AZI  
 PSM  
 DAZ  
 SLS  
 POL  
 PRA

.24746265 03  
 .32843853 02  
 .12447882-02  
 .17897040 03  
 .35175817 03

JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .23546989 05 HA .32301571 03 DEC -.29489662 02 LONG  
 MIN .59999999 02 HA .32301571 03 DEC -.23467549 02 ELE  
 CKM .34057459 03 CKC .27092133 03 CKT .34057459 03 PSS  
 UT .10000000 01 OHA -.30897785-02 DDE -.30422061-03 DEL  
 ET .99905556 00 RGE .17935687 05 DRG .49906877 01 DDR  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS  
 DT .59827003-01 RFI .00000000 00 RF2 .00000000 00 BFI  
 ESS1 -.10576843 03 ESS2 -.12936843 03 F1 .11705920 06 F2  
 RF .00000000 00 DDP .30140792-05

.54964454 02  
 .57148777 02  
 .14248983 03  
 -.26739291-02  
 -.47062414-03  
 .14249399 03  
 .13401014 06  
 .13196417 06  
 .24721150 03

AZI  
 PSM  
 DAZ  
 SLS  
 POL  
 PRA

.10508355 03  
 .14971538 02  
 .78018599-03  
 .17716843 03  
 .15852611 03

0 DAYS 2 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437778.46133102

APRIL 23, 1962 23 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X -.84510706 04 Y -.33110474 05 Z -.19137916 05 OX .89835572 00 DY -.387555427 01 DZ -.17825849 01  
 R .39166106 05 DEC -.29250880 02 RA .25568151 03 V .43594131 01 PTH .65079385 02 AZ .84656835 02  
 R .39166106 05 LAT -.29250880 02 LON .58098108 02 VE .40123652 01 PTE .80175079 02 AZE .28446775 03  
 XS .12574499 09 YS .75795506 08 ZS .32866794 08 DXS -.15858492 02 DYS .22937064 02 DZS .99452341 01  
 XM -.73810904 05 YM -.35957664 06 ZM -.12543961 06 DXM .10005153 01 DYM -.12081335 00 DZM -.11073228 00  
 XT -.73810904 05 YT -.35957664 06 ZT -.12543961 06 DXT .10005153 01 DYT -.12081335 00 DZT -.11073228 00  
 RS .15045593 09 VS .29605884 02 RM .38791559 06 VM .10138483 01 RT .38791559 06 VT .10138483 01  
 GED -.29417072 02 ALT .32793055 05 LOS .19349687 03 RAS .31080374 02 RAM .25839993 03 LDM .60816421 02  
 DUT .34000000 02 DT .48000000 03 DR .39535191 01 SHA .27463491 05 DES .12617891 02 DEM -.18866748 02

.58098108 02  
 .14405411 02  
 .14432366 03  
 -.68021010-04  
 -.10603779-03  
 .14433189 03  
 .13714918 06  
 .12568676 06  
 .24650991 03

AZI  
 PSM  
 DAZ  
 SLS  
 POL  
 PRA

.24891389 03  
 .12309489 02  
 -.17794774-03  
 .18347952 03  
 .13972910 02

OOMJET 1 UNIFORM TIME TAU .00000000 00  
 R .39166106 05 HA .87958607 02 DEC -.29250880 02 LONG  
 MIN .12000000 03 HA .27735892 03 CKC .34653941 03 PSS  
 CKM .34653941 03 CKC .15602993-03 DDE -.12010288-03 DEL  
 UT .20000000 01 OHA .37091346 05 DRG .40105717 01 DDR  
 ET .19990555 01 RGE .37091346 05 DRG .40105717 01 DDR  
 RDI .63725236 04 PHI -.31210140 02 THI .13688502 03 SPS  
 DT .12372339 00 RFI .00000000 00 RF2 .00000000 00 BFI  
 ESS1 -.12372339 00 ESS2 -.13567952 03 F1 .11402428 06 F2  
 RF .00000000 00 DDP .67911159-06

.58098108 02  
 .14405411 02  
 .14432366 03  
 -.68021010-04  
 -.10603779-03  
 .14433189 03  
 .13714918 06  
 .12568676 06  
 .24650991 03

.24891389 03  
 .12309489 02  
 -.17794774-03  
 .18347952 03  
 .13972910 02

3

## CASE 1 SPACE TRAJECTORIES

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .39166106 05 LAT .29250880 02 LONG  
 MIN .12000000 03 HA .32390431 03 DEC .58098108 02  
 CKM .34480411 03 CKC .27562362 03 CKT .34480411 03 PSS .57907925 02  
 UT .20000000 01 DHA .19698104-02 DDE .20948451-03 DEL .13061838 03  
 ET .19990555 01 RGE .33618075 05 DRG .3813485 01 DDR .17088464-02 DAZ -.54518322-03  
 RDI .63754947 04 PHI .25734820 02 THI .27684780 02 SPS .18262553 03  
 DT .11213781 00 RFI .00000000 00 RF2 .13756304 06 PDL .16877430 03  
 ESSI -.11122553 03 ESS2 -.13482553 03 F1 .11362240 06 F2 .26136396 03  
 RF .00000000 00 DOP .12730008-05 PRA .12485912 06

0 DAYS 3 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437778.50299768 APRIL 24, 1962 00 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X -.49788086 04 Y -.45888029 05 Z -.24891258 05 DX .10063196 01 DY -.32776912 01 DZ -.14478074 01  
 R .52441157 05 DEC -.28336655 02 RA .26380758 03 V .37218389 01 PTH .68370344 02 AZ .80736554 02  
 R .52441155 05 LAT -.28336656 02 LON .51183062 02 VE .40082783 01 PTE .59672786 02 AZE .27626424 03  
 XS .12568787 09 YS .75878068 08 ZS .32902589 08 DXS -.15876106 02 DYS .22926535 02 DZS .99406582 01  
 XM -.70205931 05 YM -.35999546 06 ZM -.12583252 06 DXM .10022236 01 DYM -.11186206 00 DZM -.10761121 00  
 XT -.70205931 05 YT -.35999546 06 ZT -.12583252 06 DXT .10022236 01 DYT -.11186206 00 DZT -.10761121 00  
 XI .15045764 09 VS .29605632 02 RM .38776210 06 VM .10141722 01 RT .38776210 06 VT .10141722 01  
 GE .15045764 09 VS .29605632 02 RM .38776210 06 VM .10141722 01 RT .38776210 06 VT .10141722 01  
 GED -.28499530 02 ALT .46067815 05 LOS .17849486 03 RAS .31119479 02 RAM .25896474 03 LOM .46340120 02  
 DUT .34000000 02 DT .48000000 03 DR .34597687 01 SHA .40961857 05 DES .12631714 02 DEM -.18935881 02

DOMJET 1 UNIFORM TIME TAU .00000000 00  
 R .52441155 05 LAT .28336656 02 LONG  
 MIN .18000000 03 HA .92476884 02 DEC -.25108292 02 ELE .51183062 02  
 CKM .34916692 03 CKC .28033124 03 CKT .34916692 03 PSS .13503771 03 AZI .24704349 03  
 UT .30000000 01 DHA .20224175-02 DDE .13178557-03 DEL -.16577692-02 DAZ -.80330767-03  
 ET .29990555 01 RGE .50878179 05 DRG .36617074 01 DDR -.85708959-04 SLS .18622470 03  
 RDI .63725296 04 PHI .31210140 02 THI .13688502 03 SPS .13505140 03 POL .22253415 02  
 DT .16971131 00 RFI .00000000 00 RF2 .00000000 00 BF1 .13826649 06 PRA .25703275 03  
 ESSI -.11482470 03 ESS2 -.13842470 03 F1 .11294335 06 F2 .12345237 06  
 RF .00000000 00 DOP .54891700-06

JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .52441155 05 LAT .28336656 02 LONG  
 MIN .18000000 03 HA .33329643 03 DEC -.28377208 02 ELE .51183062 02  
 CKM .34614523 03 CKC .27730955 03 CKT .34614523 03 PSS .12582878 03 AZI .10238879 03  
 UT .30000000 01 DHA .30565938-02 DDE .20615412-03 DEL -.26895279-02 DAZ -.50206932-03  
 ET .29990555 01 RGE .46547833 05 DRG .33563036 01 DDR -.10634586-02 SLS .18545206 03  
 RDI .63754947 04 PHI .25734820 02 THI .27684780 02 SPS .12584314 03 POL .17527630 03  
 DT .15526684 00 RFI .00000000 00 RF2 .00000000 00 BF1 .13924461 06 PRA .26701295 03  
 ESSI -.11405206 03 ESS2 -.13765206 03 F1 .11198714 06 F2 .12149633 06  
 RF .00000000 00 DOP .68108457-06

4

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362

STATION PRINTS BK

0 DAYS 4 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437778.54466435

APRIL 24, 1962 01 04 19.000

GEOCENTRIC

EQUATORIAL COORDINATES

X	-12996368	04	Y	-56970662	05	Z	-29719555	05	DX	10307415	01	DY	-29038373	01	DZ	-12489029	01
R	64269723	05	DEC	-27543326	02	RA	26869317	03	V	33248243	01	PTH	70325571	02	AZ	78444530	02
R	64269722	05	LAT	-27543327	02	LON	41027489	02	VE	43826523	01	PTE	45589511	02	AZE	27419247	03
XS	12563068	09	YS	75960587	08	ZS	32938369	08	DXS	-15893713	02	DYS	22915994	02	DZS	99360782	01
XM	66594969	05	YM	36038202	06	ZM	-12621439	06	DXM	10038448	01	DYM	-10288963	00	DZM	-10447663	00
XT	66594969	05	YT	-36038202	06	ZT	-12621439	06	DXT	10038448	01	DYT	-10288963	00	DZT	-10447663	00
RS	15045934	09	VS	29605380	02	RM	38760826	06	VM	10144979	01	RT	38760826	06	VT	10144979	01
GED	-27703185	02	ALT	57896134	05	LOS	16349290	03	RAS	31158584	02	RAM	25953041	03	LOM	31864727	02
DUT	34000000	02	DT	48000000	03	DR	31307242	01	SHA	53000242	05	DES	12645532	02	DEM	-19003357	02

OONJET

1 UNIFORM TIME

TAU .00000000 00

R	64269722	05	LAT	-27543327	02	LONG	41027489	02
MIN	24000000	03	HA	10124026	03	DEC	-24564020	02
CKM	35034759	03	CKC	28179556	03	CKT	35034759	03
UT	40000000	01	DHA	27510852	-02	DDE	15796001	-03
ET	39990555	01	RGE	63547821	05	DRG	33875645	01
RDI	63725296	04	PHI	-31210140	02	THI	13688502	03
DT	21197269	00	RFI	00000000	00	RF2	00000000	00
ESS1	-11675608	03	ESS2	-14035608	03	F1	11209801	06
RF	00000000	00	DOP	43589759	-06	F2	12169655	06

AZ1	24336392	03
PSM	74425628	01
DAZ	-12250799	-02
SLS	18815608	03
PDL	29104045	02
PRA	26331044	03

JOBJET

1 UNIFORM TIME

TAU .00000000 00

R	64269722	05	LAT	-27543327	02	LONG	41027489	02
MIN	24000000	03	HA	34518014	03	DEC	-27663365	02
CKM	34693961	03	CKC	27838758	03	CKT	34693961	03
UT	40000000	01	DHA	34902269	-02	DDE	13120577	-03
ET	39990555	01	RGE	58050133	05	DRG	33595642	01
RDI	63754947	04	PHI	-25734820	02	THI	27684780	02
DT	19363437	00	RFI	00000000	00	RF2	00000000	00
ESS1	-11597013	03	ESS2	-13957013	03	F1	11107251	06
RF	00000000	00	DOP	40414691	-06	F2	11959578	06

AZ1	10158627	03
PSM	13075784	02
DAZ	31727875	-03
SLS	18737013	03
PDL	18220391	03
PRA	27017032	03

0 DAYS 5 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437778.58633102

APRIL 24, 1962 02 04 19.000

GEOCENTRIC

EQUATORIAL COORDINATES

X	24122900	04	Y	-66925513	05	Z	-33957724	05	DX	10289458	01	DY	-26400631	01	DZ	-11131699	01
R	75086419	05	DEC	-26888040	02	RA	27206430	03	V	30443078	01	PTH	71656041	02	AZ	76901942	02
R	75086419	05	LAT	-26888040	02	LON	29357543	02	VE	48991478	01	PTE	36144144	02	AZE	27314606	03
XS	12557343	09	YS	76043069	08	ZS	32974131	08	DXS	-15911312	02	DYS	22905442	02	DZS	99314936	01
XM	62978333	05	YM	-36073625	06	ZM	-12658484	06	DXM	10053782	01	DYM	-93896731	-01	DZM	-10132867	00
XT	62978333	05	YT	-36073625	06	ZT	-12658484	06	DXT	10053782	01	DYT	-93896731	-01	DZT	-10132867	00
RS	15046105	09	VS	29605129	02	RM	38745404	06	VM	10148248	01	RT	38745404	06	VT	10148248	01
GED	-27045314	02	ALT	68712629	05	LOS	14849094	03	RAS	31197693	02	RAM	26009694	03	LOM	17390188	02
DUT	34000000	02	DT	48000000	03	DR	28896092	01	SHA	64009238	05	DES	12659345	02	DEM	-19069164	02

5

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362

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## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK

APRIL 24, 1962 04 04 19.000

JULIAN DATE 2437778.66966435

0 DAYS 7 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.97321567 04	Y	-.84542882 05	Z	-.41275826 05	DX	.10017070 01	DY	-.22810635 01	DZ	-.93442376 00
R	.94582807 05	DEC	-.25874337 02	RA	.27656670 03	V	.26607922 01	PTH	.73391329 02	AZ	.74896995 02
R	.94582807 05	LAT	-.25874337 02	LON	.37778159 01	VE	.60396123 01	PTE	.24972074 02	AZE	.27207423 03
XS	.12545873 09	YS	.76207921 08	ZS	.33045608 08	DXS	-.15946488 02	DYS	.22884305 02	DZS	.99223096 01
XM	-.55729277 05	YM	-.36134740 06	ZM	-.12729163 06	DXM	.10081806 01	DYM	-.75852425-01	DZM	-.94993529-01
XT	-.55729277 05	YT	-.36134740 06	ZT	-.12729163 06	DXT	.10081806 01	DYT	-.75852425-01	DZT	-.94993529-01
RS	.15046445 09	VS	.29604630 02	RM	.38714448 06	VM	.10154829 01	RT	.38714448 06	VT	.10154829 01
GED	-.26027452 02	ALT	.18820871 05	LDS	.11848704 03	RAS	.31275923 02	RAM	.26123255 03	LOM	.34844367 03
DUT	.34000000 02	DT	.95999999 03	DR	.25497822 01	SHA	.83845630 05	DES	.12686950 02	DEM	-.19195723 02

## JOBJET

R	.94582807 05	1	UNIFORM TIME	TAU	.00000000 00	LONG	.37778169 01
MIN	.42000000 03	HA	.25576492 02	DEC	-.25874337 02	ELE	.66997094 02
CKM	.34859280 03	CKC	.28070981 03	CKT	.34859280 03	PSM	.14766561 02
UT	.70000000 01	DHA	.38728467-02	DDE	.15848673-03	DEL	-.44615120-03
ET	.69905554 01	RGE	.88681440 05	DRG	.25929387 01	DDR	-.16898932-04
RDI	.63754947 04	PHI	-.25734820 02	THI	.27684780 02	SPS	.11909843 03
DT	.29580940 00	RF1	.00000000 00	RF2	.00000000 00	BF1	.14136918 06
ESS1	-.11965072 03	ESS2	-.14325072 03	F1	.10993615 06	F2	.11724763 06
RF	.00000000 00	DOP	.10822802-06				.27489717 03

APRIL 24, 1962 05 04 19.000

JULIAN DATE 2437778.71133102

0 DAYS 8 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.13307930 05	Y	-.92512164 05	Z	-.44521867 05	DX	.98471384 00	DY	-.21502615 01	DZ	-.870999852 00
R	.10352680 06	DEC	-.25470837 02	RA	.27818588 03	V	.25203024 01	PTH	.73997634 02	AZ	.74193142 02
R	.10352680 06	LAT	-.25470837 02	LON	.35035592 03	VE	.66099047 01	PTE	.21500961 02	AZE	.27176350 03
XS	.12540129 09	YS	.76290291 08	ZS	.33081322 08	DXS	-.15964065 02	DYS	.22873720 02	DZS	.99177105 01
XM	-.52097497 05	YM	-.36160419 06	ZM	-.12762787 06	DXM	.10094489 01	DYM	-.66802531-01	DZM	-.91806851-01
XT	-.52097497 05	YT	-.36160419 06	ZT	-.12762787 06	DXT	.10094489 01	DYT	-.66802531-01	DZT	-.91806851-01
RS	.15046616 09	VS	.29604381 02	RM	.38678916 06	VM	.10158140 01	RT	.38698916 06	VT	.10158140 01
GED	-.25622242 02	ALT	.97152586 05	LDS	.10348509 03	RAS	.31315044 02	RAM	.26180162 03	LOM	.33397166 03
DUT	.34000000 02	DT	.95999999 03	DR	.24226415 01	SHA	.92941458 05	DES	.12700744 02	DEM	-.19256454 02

## JOBJET

R	.10352680 06	1	UNIFORM TIME	TAU	.00000000 00	LONG	.35035592 03
MIN	.48000000 03	HA	.39572277 02	DEC	-.25470837 02	ELE	.54395812 02
CKM	.34905924 03	CKC	.28136326 03	CKT	.34905924 03	PSM	.11815515 03
UT	.80000000 01	DHA	.38985758-02	DDE	.15139272-03	DEL	-.35059837-02
ET	.79990555 01	RGE	.98276590 05	DRG	.26399431 01	DDR	-.13138762-04
RDI	.63754947 04	PHI	-.25734820 02	THI	.27684780 02	SPS	.11818813 03
DT	.32781537 00	RF1	.00000000 00	RF2	.00000000 00	BF1	.14153891 06
ESS1	-.12054307 03	ESS2	-.14414307 03	F1	.10976985 06	F2	.11690821 06
RF	.00000000 00	DOP	.84146279-07				.27594246 03

APRIL 24, 1962 06 04 19.000

JULIAN DATE 2437778.75299768

0 DAYS 9 HRS. 0 MIN. 0.000 SEC.

CASE 1  
RANGER-4 ORBIT 042362 STATION PRINTS BK  
GEOCENTRIC

SPACE TRAJECTORIES										EQUATORIAL COORDINATES									
X	.16821781	05	Y	-.10004920	06	Z	-.47559722	05	DX	.96743402	00	DY	-.20399109	01	DZ	-.81819516	00		
R	.11204794	06	DEC	-.25116394	02	RA	.27954416	03	V	.24013764	01	PTH	.74496169	02	AZ	.73609961	02		
R	.11204794	06	LAT	-.25116394	02	LONG	.33667314	03	VE	.71684681	01	PTE	.18832467	02	AZE	.73609961	03		
XS	.12534379	09	YS	.76372622	08	ZS	.33117018	08	DXS	-.15981633	02	DYS	.22863125	02	DZS	.99131072	01		
XM	-.48461326	05	YM	-.36182836	06	ZM	-.12795252	06	DXM	.10106282	01	DYM	-.57735189	-01	DZM	-.88607791	-01		
XT	-.48461326	05	YT	-.36182836	06	ZT	-.12795252	06	DXT	.10106282	01	DYT	-.57735189	-01	DZT	-.88607791	-01		
RS	.15046787	09	VS	.29604134	02	RM	.38683347	06	VM	.10161466	01	RT	.38683347	06	VT	.10161466	01		
GED	-.25266272	02	ALT	.10567362	06	LOS	.88483147	02	RAS	.31354167	02	RAM	.26237150	03	LOM	.31950048	03		
DUT	.34000000	02	DT	.95999999	03	DR	.23139956	01	SHA	.10160448	06	DES	.12714533	02	DEM	-.19315472	02		

JOBJET 1 UNIFORM TIME TAU .00000000 00  
R .11204794 06  
MIN .54000000 03 HA .536233962 02 DEC -.25116394 02 LONG .33667314 03  
CKM .34948821 03 CKC .28196727 03 CKT .34948821 03 PSS .11728105 03 AZI .25914121 03  
UT .90000000 01 DHA .39055889-02 DDE .15263859-03 DEL -.34905630-02 DAZ -.90420448-03  
ET .89990555 01 RGE .10769816 06 DRG .25946691 01 DUR -.12446182-04 SLS .19273823 03  
RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .11731749 03 POL .15482780 02  
DT .35924233 00 RFI .00000000 00 RF2 .00000000 00 BFI .14168391 06  
ESS1 -.12133823 03 ESS2 -.14493823 03 FI .10963127 06 F2 .11661824 06 PRA .27693184 03  
RF .00000000 00 DOP .79710695-07

0 DAYS 10 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437778.79466435 APRIL 24, 1962 07 04 19.000

GEOCENTRIC

SPACE TRAJECTORIES										EQUATORIAL COORDINATES									
X	.20273766	05	Y	-.10721795	06	Z	-.50422306	05	DX	.95040081	00	DY	-.19449705	01	DZ	-.77328210	00		
R	.12020451	06	DEC	-.24801194	02	RA	.28070750	03	V	.22987251	01	PTH	.74914334	02	AZ	.73115670	02		
R	.12020451	06	LAT	-.24801195	02	LONG	.32279550	03	VE	.77128150	01	PTE	.16724411	02	AZE	.27134796	03		
XS	.12528622	09	YS	.76454911	08	ZS	.33152638	08	DXS	-.15999195	02	DYS	.22852518	02	DZS	.99084991	01		
XM	-.44821065	05	YM	-.36201986	06	ZM	-.12826593	06	DXM	.10117180	01	DYM	-.48651113	-01	DZM	-.85396578	-01		
XT	-.44821065	05	YT	-.36201986	06	ZT	-.12826593	06	DXT	.10117180	01	DYT	-.48651113	-01	DZT	-.85396578	-01		
RS	.15046957	09	VS	.29603887	02	RM	.38667742	06	VM	.10164806	01	RT	.38667742	06	VT	.10164806	01		
GED	-.24949696	02	ALT	.11383010	06	LOS	.73481204	02	RAS	.31393293	02	RAM	.26294221	03	LOM	.30503012	03		
DUT	.34000000	02	DT	.95999999	03	DR	.22195059	01	SHA	.10989419	06	DES	.12728314	02	DEM	-.19372764	02		

JETGOLD-3 1 UNIFORM TIME TAU .00000000 00  
R .12020450 06  
MIN .59999999 03 HA .27768663 03 DEC -.24801195 02 LONG .32279550 03  
CKM .34683445 03 CKC .27947861 03 CKT .34683445 03 PSS .11157324 03 AZI .11609888 03  
UT .10000000 02 DHA .39547188-02 DDE .12105383 06 DRG .18983904 01 DUR -.22677646-04 SLS .19375364 03  
ET .99990555 01 RGE .12105383 06 DUT .12105383 06 DZT .11161610 03 POL .21866572 03  
RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .11161610 03  
DT .40379205 00 RFI .00000000 00 RF2 .00000000 00 BFI .14391389 06  
ESS1 -.12235364 03 ESS2 -.14595364 03 FI .10746941 06 F2 .11215874 06 PRA .28342085 03  
RF .00000000 00 DOP .14523739-06



8

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .12020450 00 HA .67680050 02 DEC -.24801195 02 LONG .32279550 03  
 MIN .59999999 03 HA .28251562 03 CKT .34987147 03 PSS .29297333 02 AZI .25562951 03  
 CKM .34987147 03 CKC .39021280-02 DDE .11695605 06 URG .25476908 01 DDR .13957703-04 SLS .19345452 03  
 UT .10000000 02 DHA .11695605 06 URG .25476908 01 DDR .13957703-04 SLS .19345452 03  
 ET .99990555 01 RGE .25476908 01 DDR .13957703-04 SLS .19345452 03  
 RDI .63754947 04 PHI .27684780 02 SPS .11644197 03 POL .19893494 02  
 DT .39012333 00 RF1 .00000000 00 RF2 .00000000 00 BF1 .14183437 06  
 ESS1 -.12205452 03 ESS2 -.14565452 03 F1 .10947883 06 F2 .11631735 06  
 RF .00000000 00 DOP .89391141-07 PRA .27791682 03

APRIL 24, 1962 08 04 19.000

JULIAN DATE 2437778.83633102

0 DAYS 11 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .23665278 05 Y -.11406732 06 Z -.53134574 05 DX .93386382 00 DY -.18620007 01 DZ -.73442343 00  
 R .12804172 06 DEC -.24517970 02 RA .28172074 03 V .22087385 01 PTH .75270645 02 AZ .72689026 02  
 R .12804171 06 LAT -.24517971 02 LON .30876759 03 VE .82422841 01 PTE .15020828 02 AZE .27120278 03  
 XS .12522858 09 YS .76537168 08 ZS .33188352 08 DXS -.16016749 02 DYS .22841900 02 DZS .99038859 01  
 XM -.41177033 05 VM -.36217863 06 ZM -.12856745 06 DXM .10127183 01 DYM -.39551062-01 DZM -.82173466-01  
 XT -.41177033 05 VT -.36217863 06 ZT -.12856745 06 DXT .10127183 01 DYT -.39551062-01 DZT -.82173466-01  
 RS .15047127 09 VS .29603641 02 RM .38652102 06 VM .10168161 01 RT .38652102 06 VT .10168161 01  
 GES -.24665220 02 ALT .12166723 06 LOS .58479257 02 RAS .31432424 02 RAM .26351374 03 LOM .29056058 03  
 DUT .34000000 02 DT .95999999 03 DR .21361541 01 SHA .11785679 06 DES .12742090 02 DEM -.19428321 02

## JEIGOLD-3

R .12804171 06 1 UNIFORM TIME TAU .00000000 00  
 MIN .60000000 03 HA .29205114 03 DEC -.28396732 02 LONG .30876759 03  
 CKM .34677993 03 CKC .27958069 03 CKT .34677993 03 PSS .11079847 01 AZI .12386340 03  
 UT .11000000 02 DHA .40231108-02 DDE .43157119-04 DEL .11100007 03 PSM .19369028 02  
 ET .10999056 02 RGE .12775991 06 URG .18323439 01 DDR .27587878-02 DAZ .23192681-02  
 RDI .63720164 04 PHI .35116540 02 THI .28319539 03 SPS .1104547 03 SLS .19422196 03  
 DT .42616112 00 RF1 .00000000 00 RF2 .00000000 00 BF1 .14412542 06 POL .22488416 03  
 ESS1 -.12282196 03 ESS2 -.14642196 03 F1 .13726154 06 F2 .11173573 06 PRA .28409739 03  
 RF .00000000 00 DOP .90449906-07

## JOBJET

R .12804171 06 1 UNIFORM TIME TAU .00000000 00  
 MIN .60000000 03 HA .81713425 02 DEC -.23555223 02 LONG .30876759 03  
 CKM .35020044 03 CKC .28300121 03 CKT .35020044 03 PSS .17009742 02 AZI .25155022 03  
 UT .11000000 02 DHA .38937315-02 DDE .12974402-03 DEL .11549548 03 PSM .15848072 02  
 ET .10999056 02 RGE .12603144 06 URG .28423790 01 DDR .16967298-04 SLS .19410365 03  
 RDI .63754947 04 PHI .25734820 02 THI .27684780 02 SPS .11553878 03 POL .24587164 02  
 DT .42039556 00 RF1 .00000000 00 RF2 .00000000 00 BF1 .14201151 06 PRA .27892451 03  
 ESS1 -.12270365 03 ESS2 -.14630364 03 F1 .10931253 06 F2 .11596310 06  
 RF .00000000 00 DOP .10866587-06

9

## CASE 1 SPACE TRAJECTORIES

RANGER-4 ORBIT 042362 STATION PRINTS BK

0 DAYS 12 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437778.87799768

APRIL 24, 1962

09 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.26998324	05	Y	-.12063577	06	Z	-.55715860	05	DX	.91793138	00	DY	-.17885617	01	DZ	-.70033346	00
R	.13559555	06	DEC	-.24261220	02	RA	.28261494	03	V	.21288536	01	PTH	.75578132	02	AZ	.72315216	02
R	.13559555	06	LAT	-.24261221	02	LON	-.29462072	03	VE	.87570525	01	PTE	.13617621	02	AZE	.27108438	03
XS	.12517089	09	YS	.76619385	08	ZS	.33224010	08	DXS	-.16034295	02	DYS	.22831271	02	DZS	.98992682	01
XM	-.37529567	05	YM	-.36230462	06	ZM	-.12885746	06	DXM	.10136286	01	DYM	-.30435837	-01	DZM	-.78938724	-01
XT	-.37529567	05	YT	-.36230462	06	ZT	-.12885746	06	DXT	.10136286	01	DYT	-.30435837	-01	DZT	-.78938724	-01
RS	.15047297	09	VS	.29603396	02	RM	.38636426	06	VM	.10171531	01	RT	.38636426	06	VT	.10171531	01
GED	-.24407321	02	ALT	.12922099	06	LDS	.43477337	02	RAS	.31471558	02	RAM	.26408606	03	LOM	.27609184	03
DUT	.34000000	02	DT	.19200000	04	DR	.20617696	01	SHA	.12552908	06	DES	.12755859	02	DEM	-.19482132	02

## JETGOLD-3

R	.13559555	06	UNIFORM TIME	TAU	.00000000	00	LONG	.29462072	03					
MIN	.72000000	03	HA	.30663577	03	DEC	-.25245178	02	ELE	.10568638	02	AZI	.13293380	03
CKM	.34675483	03	CKC	.27970488	03	CKT	.34675483	03	PSS	.11062166	03	PSM	.19330565	02
UT	.12000000	02	DHA	.40771127	-02	DDE	.44606207	-04	DEL	.24749049	-02	DAZ	.27388672	-02
ET	.11999055	02	RGE	.13428208	06	DRG	.17957361	01	DDR	-.63767464	-05	SLS	.19465443	03
RDI	.63720164	04	PHI	.35116540	02	THI	.24319539	03	SPS	.11066950	03	POL	.23255145	03
DT	.44791673	00	RF1	.00000000	00	RF2	.00000000	00	BF1	.14424266	06	PRA	.28455383	03
ESS1	-.12325443	03	ESS2	-.14685443	03	F1	.10713681	06	F2	.11150126	06	PRA	.28455383	03
RF	.00000000	00	DOP	.40839424	-07									

## JOBJET

R	.13559555	06	UNIFORM TIME	TAU	.00000000	00	LONG	.29462072	03					
MIN	.72000000	03	HA	.95713619	02	DEC	-.23112380	02	ELE	.50461505	01	AZI	.24674086	03
CKM	.35046814	03	CKC	.28341819	03	CKT	.35046814	03	PSS	.11455352	03	PSM	.16122721	02
UT	.12000000	02	DHA	.38842231	-02	DDE	.11608587	-03	DEL	-.32652357	-02	DAZ	-.14596868	-02
ET	.11999055	02	RGE	.13488597	06	DRG	.2244619	01	DDR	-.20865812	-04	SLS	.19469340	03
RDI	.63754947	04	PHI	-.25734820	02	THI	.27684780	02	SPS	.11460022	03	POL	.29820462	02
DT	.44993110	00	RF1	.00000000	00	RF2	.00000000	00	BF1	.14222903	06	PRA	.27996538	03
ESS1	-.12329340	03	ESS2	-.14689340	03	F1	.10910466	06	F2	.11552810	06	PRA	.27996538	03
RF	.00000000	00	DOP	.13363363	-06									

0 DAYS 13 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437778.919666435

APRIL 24, 1962

10 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.30275166	05	Y	-.12695424	06	Z	-.58181557	05	DX	.90263938	00	DY	-.17228664	01	DZ	-.67008094	00
R	.14289527	06	DEC	-.24026699	02	RA	.28341298	03	V	.20571910	01	PTH	.75846288	02	AZ	.71983564	02
R	.14289527	06	LAT	-.24026700	02	LON	.28037769	03	VE	.92576745	01	PTE	.12443040	02	AZE	.27098611	03
XS	.12511313	09	YS	.76701565	08	ZS	.33259640	08	DXS	-.16051834	02	DYS	.22820631	02	DZS	.98946453	01
XM	-.33878979	05	YM	-.36239776	06	ZM	-.12913579	06	DXM	.10144485	01	DYM	-.21306185	-01	DZM	-.75692599	-01
XT	-.33878979	05	YT	-.36239776	06	ZT	-.12913579	06	DXT	.10144485	01	DYT	-.21306185	-01	DZT	-.75692599	-01
RS	.15047468	09	VS	.29603151	02	RM	.38620717	06	VM	.10174916	01	RT	.38620717	06	VT	.10174916	01
GED	-.24171741	02	ALT	.13652064	06	LDS	.28475403	02	RAS	.31510697	02	RAM	.26465918	03	LOM	.26162389	03
DUT	.34000000	02	DT	.19200000	04	DR	.19947413	01	SHA	.13294098	06	DES	.12769623	02	DEM	-.19534185	02

10

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 JETGOLD-3 1 UNIFORM TIME TAU .00000000 00  
 R .14289527 06 LAT .24026700 02 LONG  
 MIN .77999999 03 HA .32138969 03 DEC -.25072170 02 ELE .28037769 03  
 CKM .34676992 03 CKC .27986282 03 CKT .34676992 03 PSS .18742575 02 AZI .14370744 03  
 UT .13000000 02 DHA .41172249-02 DDE .51881665-04 DEL .11039199 03 PSM .19173580 02  
 ET .12999055 02 RGE .14072037 06 DRG .17850567 01 DDR .20371425-02 DAZ .32599171-02  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .22492879-06 SLS .19506121 03  
 DT .46939257 00 RF1 .00000000 00 RF2 .00000000 00 BF1 .11044220 03 PDL .24200623 03  
 ESS1 -.12366121 03 ESS2 -.14726121 03 F1 .13710910 06 F2 .11143286 06 PRA .28484099 03  
 RF .00000000 00 DOP -.14405406-08

JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .14289527 06 LAT .24026700 02 LONG  
 MIN .77999999 03 HA .10968171 03 DEC -.22720546 02 ELE .28037769 03  
 CKM .35067001 03 CKC .28376291 03 CKT .35067001 03 PSS .11357903 03 AZI .24092970 03  
 UT .13000000 02 DHA .38762531-02 DDE .13147553-03 DEL .31047672-02 DAZ .17873913-02  
 ET .12999055 02 RGE .14346971 06 DRG .23417228 01 DDR .25118119-04 SLS .19522927 03  
 RDI .63754947 04 PHI .25734820 02 THI .27684780 02 SPS .11362908 03 PUL .35913616 02  
 DT .47856336 00 RF1 .00000000 00 RF2 .00000000 00 BF1 .14249402 06 PRA .28103836 03  
 ESS1 -.12382927 03 ESS2 -.14742927 03 F1 .10884136 06 F2 .11499818 06  
 RF .00000000 00 DOP .16086723-06

APRIL 24, 1962 11 04 19.000

JULIAN DATE 2437778.96133102

0 DAYS 14 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .33498107 05 Y -.13304807 06 Z -.60544207 05 DX .88798573 00 DY -.16635709 01 DZ -.64297254 00  
 R .14996504 06 DEC -.23811075 02 RA .28413189 03 V .19923354 01 PTH .76082198 02 AZ .71686122 02  
 R .14996504 06 LAT -.23811076 02 LON .26605553 03 VE .97448552 01 PTE .11446199 02 AZE .27090335 03  
 XS .12505531 09 YS .76783703 08 ZS .33295255 08 DXS -.16069365 02 DYS .22809980 02 DZS .98900184 01  
 XM -.30225613 05 YM -.36245801 06 ZM .12940243 06 DXM .10151780 01 DYM -.12162923-01 DZM -.72435371-01  
 XT -.30225613 05 YT -.36245801 06 ZT .12940243 06 DXT .10151780 01 DYT -.12162923-01 DZT -.72435371-01  
 RS .15047638 09 VS .29602908 02 RM .38604971 06 VM .10178316 01 RT .38604971 06 VT .10178316 01  
 GED -.23955134 02 ALT .14359035 06 LOS .13473476 02 RAS .31549837 02 RAM .26523309 03 LOM .24715673 03  
 DUT .34000000 02 DT .19200000 04 DR .19338441 01 SHA .14011723 06 DES .12783381 02 DEM -.19584474 02

## JETGOLD-3

R .14996504 06 LAT .23811076 02 LONG  
 MIN .84000000 03 HA .33626366 03 DEC -.25869668 02 ELE .26605553 03  
 CKM .34683053 03 CKC .28006058 03 CKT .34683053 03 PSS .11026658 03 AZI .15644294 03  
 UT .14000000 02 DHA .41439001-02 DDE .60790922-04 DEL .14113486-02 PSM .18928263 02  
 ET .13999055 02 RGE .14715999 06 DRG .17955927 01 DDR .53604284-05 SLS .38088499-02  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .11031913 03 PDL .19544986 03  
 DT .49087281 00 RF1 .00000000 00 RF2 .00000000 00 BF1 .14424312 06  
 ESS1 -.12404986 03 ESS2 -.14764986 03 F1 .10713681 06 F2 .11150034 06 PRA .28500809 03  
 RF .00000000 00 DOP -.34330487-07

11

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK JULIAN DATE 2437779.00299768 APRIL 24, 1962 12 04 19.000

0 DAYS 15 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.36669409 05	Y	-.13893837 06	Z	-.62814101 05	DX	.87394927 00	DY	-.16096418 01	DZ	-.61847981 00
R	.15682515 06	DEC	-.23611685 02	RA	.28478470 03	V	.19331972 01	PTH	.76291296 02	AZ	.71416859 02
R	.15682515 06	LAT	-.23611685 02	LON	.25166726 03	VE	.10219343 02	PTE	.10590101 02	AZE	.27083278 03
XS	.12499743 09	YS	.76865803 08	ZS	.33330851 08	DXS	-.16086888 02	DYS	.22799319 02	DZS	.98853869 01
XM	-.26569788 05	YM	-.36248532 06	ZM	-.12965732 06	DXM	.10158166 01	DYM	-.30088214-02	DZM	-.69167298-01
XT	-.26569788 05	YT	-.36248532 06	ZT	-.12965732 06	DXT	.10158166 01	DYT	-.30088214-02	DZT	-.69167298-01
*RS	.15047808 09	VS	.24602665 02	RM	.38589193 06	VM	.10181731 01	RT	.38589193 06	VT	.10181731 01
GED	-.23754827 02	ALT	.15045040 06	LUS	.35347155 03	RAS	.31588981 02	RAM	.26580777 03	LOM	.23269035 03
DUT	.34000000 02	DT	.19200000 04	DR	.18731255 01	SHA	.14707860 06	DES	.12797133 02	DEM	-.19632984 02

## JETGOLD-3

I UNIFORM TIME

TAU .00000000 00

LAT

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DZS

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DES

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12

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
JETGOLD-3  
R .16349285 06  
MIN .95999999 03 HA  
CKM .34708486 03 CKC  
UT .16000000 02 DHA  
ET .15999055 02 RGE  
ROI .63720164 04 PHI  
DT .53465726 00 RFI  
ESS1 .12479199 03 ESS2  
RF .00000000 00 DDP

STATION PRINTS BK  
UNIFORM TIME TAU .00000000 00  
LAT -23426373 02  
LONG .23722307 03  
ELE .292334859 02 AZI  
PSS .11016237 03 PSM  
DEL -30140234-03 DAZ  
DUR .10350249-04 SLS  
SPS .11021963 03 POL  
BFI .14404777 06  
F2 .11189100 06 PRA  
F2 .28516703 03

DOMJET  
R .16349285 06  
MIN .95999999 03 HA  
CKM .35017505 03 CKC  
UT .16000000 02 DHA  
ET .15999055 02 RGE  
ROI .63725296 04 PHI  
DT .54438128 00 RFI  
ESS1 .12494855 03 ESS2  
RF .00000000 00 DDP

UNIFORM TIME TAU .00000000 00  
LAT -23426373 02  
LONG .23722307 03  
ELE .15041605 01 AZI  
PSS .10778591 03 PSM  
DEL -31110514-02 DAZ  
DUR -19419087-04 SLS  
SPS .10784505 03 POL  
BFI .14524529 06  
F2 .10949622 06 PRA  
F2 .28741527 03

0 DAYS 17 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.08633102

APRIL 24, 1962 14 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .42865679 05 Y .15017699 06 Z -.67108931 05 DX .84760159 00 DY -.15148071 01 DZ -.57578363 00  
R .16998295 06 DEC -.23253377 02 RA .28593057 03 V .18288236 01 PTH .76645172 02 AZ .70945051 02  
R .16998295 06 LAT -.23253377 02 LON .22273100 03 VS .11133155 02 PTE .91968044 01 AZE .27071900 03  
XS .12488147 09 YS .77029889 08 ZS .33401996 08 DXS -.16121912 02 DYS .22777962 02 DZS .98761090 01  
XM -.19252045 05 YM -.36244095 06 ZM -.13013170 06 DXM .10168201 01 DYM .15340825-01 DZM -.62599643-01  
XT -.19252045 05 YT -.36244095 06 ZT -.13013170 06 DXT .10168201 01 DYT .15340825-01 DYT -.62599643-01  
RS .15048149 09 VS .29602181 02 RM .38557534 06 VM .10188608 01 RT .38557534 06 VT .10188608 01  
GED -.23394857 02 ALT .16360810 06 LOS .32846772 03 RAS .31667280 02 RAM .26695943 03 LOM .20375987 03  
DUT .34000000 02 UT .19200000 04 DR .17793691 01 SHA .16042486 06 DES .12824618 02 DEM -.19724637 02

JETGOLD-3  
R .16998295 06  
MIN .10200000 04 HA  
CKM .34726632 03 CKC  
UT .17000000 02 DHA  
ET .16999055 02 RGE  
ROI .63720164 04 PHI  
DT .55717665 00 RFI  
ESS1 .12515034 03 ESS2  
RF .00000000 00 DDP

UNIFORM TIME TAU .00000000 00  
LAT -23253377 02  
LONG .22273100 03  
ELE .26568513 02 AZI  
PSS .11011051 03 PSM  
DEL -11606794-02 DAZ  
DUR .10069803-04 SLS  
SPS .11017021 03 POL  
BFI .14392832 06  
F2 .11212988 06 PRA  
F2 .28524047 03

13

## SPACE TRAJECTORIES

CASE 1

RANGER-4 OR811 042362 STATION PRINTS BK  
 OOMJET I UNIFORM TIME TAU .00000000 00  
 R LAT -23253377 02 LONG  
 MIN .16998295 06 HA .27215549 03 DEC -22261561 02 ELE .22273100 03  
 CKM .10200000 04 CKC .28354944 03 CKT .34993676 03 PSS .13066085 02 AZI .10830666 03  
 UT .17000000 02 DHA .40585478-02 DDE -13090644-04 DEL .10736085 03 PSM .19063214 02  
 ET .16990055 02 RGE .16842889 06 DRG .14258704 01 DDR -12098548-04 SLS .18382197-02  
 RDI .63725296 04 PHI .31210140 02 THI .13688502 03 SPS .19662240 03 .15841273 03  
 DT .56181823 00 RFI .00000000 00 RF2 .14542723 06 PRA .28792909 03  
 ESS1 -12522240 03 ESS2 -14882240 03 F1 .10600045 06 F2 .10913236 06  
 RF .00000000 00 DOP .77484298-07

0 DAYS 18 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.12799768

APRIL 24, 1962 15 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .45894615 05 Y .15555362 06 Z -.69147481 05 DX .83522049 00 DY -.14727345 01 DZ -.55699436 00  
 R .17630830 06 DEC -.23091235 02 RA .28643819 03 V .17823532 01 PTH .76796048 02 AZ .70735793 02  
 R .17630830 06 LAT -.23091235 02 LON .20819756 03 VE .11573834 02 PTE .86227141 01 AZE .27067256 03  
 XS .12482339 09 YS .77111875 08 ZS .33431543 08 DXS -.16139413 02 DYS .22767267 02 DZS .98714633 01  
 XM -.15590798 05 YM -.36236919 06 ZM -.13035112 06 OXM .10171846 01 UYM .24530751-01 DYM -.59300611-01  
 XT -.15590798 05 YT -.36236919 06 ZT -.13035112 06 OXT .10171846 01 DYT .24530751-01 DZT -.59300611-01  
 RS .15048319 09 VS .29601940 02 RM .38541654 06 VM .10192070 01 RT .38541654 06 VT .10192070 01  
 GEO -.23231955 02 ALT .16993342 06 LOS .31346580 03 RAS .31706435 02 RAM .26753638 03 LDM .18929575 03  
 DUT .34000000 02 UT .19200000 04 DR .17352334 01 SHA .16683808 06 DES .12838352 02 DEM -.19767758 02

## JETGOLD-3

R .17630830 06 I UNIFORM TIME TAU .00000000 00  
 MIN .10800000 04 HA .36082359 02 DEC -.24750292 02 ELE .20819756 03  
 CKM .34747056 03 CKC .28120257 03 CKT .34747056 03 PSS .11001977 03 PSM .21497153 03  
 UT .18000000 02 DHA .41387877-02 DDE .90613000-04 DEL .18628388-02 DAZ .34997444-02  
 ET .17990055 02 RGE .17391719 06 DRG .19270277 01 DDR .80755034-05 SLS .19690092 03  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .11008196 03 POL .30638452 03  
 DT .58012521 00 RFI .00000000 00 RF2 .00000000 00 BFI .14382217 06 PRA .28535366 03  
 ESS1 -12550092 03 ESS2 -.14910092 03 F1 .10755256 06 F2 .11234215 06  
 RF .00000000 00 DOP -.51718994-07

## OOMJET

R .17630830 06 I UNIFORM TIME TAU .00000000 00  
 MIN .10800000 04 HA .28684429 03 DEC -.22303521 02 ELE .20819756 03  
 CKM .34727296 03 CKC .28345997 03 CKT .34727296 03 PSS .10708370 03 PSM .10184204 03  
 UT .18000000 02 DHA .41010014-02 DDE -.97561570-05 DEL .34369801-02 DAZ .17764256-02  
 ET .17990055 02 RGE .17349964 06 DRG .13956347 01 DDR .47274666-05 SLS .19688004 03  
 RDI .63725296 04 PHI .31210140 02 THI .13688502 03 SPS .10714682 03 POL .16198323 03  
 DT .57873242 00 RFI .00000000 00 RF2 .00000000 00 BFI .14552407 06 PRA .28828136 03  
 ESS1 -12548004 03 ESS2 -.14908004 03 F1 .10590345 06 F2 .10893871 06  
 RF .00000000 00 DOP .30276728-07

14

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK JULIAN DATE 2437779.16966435 APRIL 24, 1962 16 04 19.000

0 DAYS 19 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	-48879863	05	Y	-16078423	06	Z	-71120975	05	DX	.82332155	00	DY	-14336245	01	DZ	-53961170	00
R	.18248014	06	DEC	-22938719	02	RA	.28690975	03	V	.17390367	01	PTH	.76932690	02	AZ	.70540854	02
R	.18248014	06	LAT	-22938719	02	LON	.19362804	03	VE	.12004516	02	PTE	.81124050	01	AZE	.27063151	03
XS	.12476526	09	YS	.77193826	08	ZS	.33473073	08	DXS	-.16156906	02	DYS	.22756561	02	DZS	.98668123	01
XM	-.11928393	05	YM	-.36226432	06	ZM	-.13055865	06	DXM	.10174571	01	DYM	.33730380	-01	DZM	-.55991790	-01
XT	-.11928393	05	YT	-.36226432	06	ZT	-.13055865	06	DXT	.10174571	01	DYT	.33730380	-01	DZT	-.55991790	-01
RS	.15048489	09	VS	.29601700	02	RM	.38525742	06	VM	.10195547	01	RT	.38525742	06	VT	.10195547	01
GED	-.23078719	02	ALT	.17610522	06	LOS	.29846389	03	RAS	.31745594	02	RAM	.26811407	03	LOM	.17483237	03
DUT	.34000000	02	DT	.19200000	04	DR	.16940241	01	SHA	.17309391	06	DES	.12852079	02	DEM	-.19809064	02

## JETGOLD-3

R	.18248014	06	HA	.50947496	02	DEC	-.24419410	02	ELE	.19362804	03
MIN	.11400000	04	CKC	.28153311	03	CKT	.34768530	03	PSS	.10986975	03
CKM	.34768530	03	DHA	.41189516	-02	DDE	.92754360	-04	DEL	-.23786237	-02
UT	.19000000	02	RGE	.18090007	06	DRG	.19502720	01	DDR	.46210925	-05
ET	.18999055	02	PHI	.35116540	02	THI	.24319539	03	SPS	.10993450	03
RDI	.63720164	04	RF1	.00000000	00	RF2	.00000000	00	BF1	.14374773	06
DT	.60341758	00	ESS2	-.14944284	03	F1	.10763571	06	F2	.11249103	06
ESS1	-.12584284	03	DOP	-.29595461	-07						
RF	.00000000	00									

## OONJET

R	.18248014	06	HA	.30167535	03	DEC	-.22328675	02	ELE	.19362804	03
MIN	.11400000	04	CKC	.28340484	03	CKT	.34955704	03	PSS	.37755985	02
CKM	.34955704	03	DHA	.41373285	-02	DDE	-.38212130	-05	DEL	.10693520	03
UT	.19000000	02	RGE	.17850867	06	DRG	.13913463	01	DDR	.35248208	-02
ET	.18999055	02	PHI	-.31210140	02	THI	.13688502	03	SPS	.22382843	-05
RDI	.63725296	04	RF1	.00000000	00	RF2	.00000000	00	BF1	.10700020	03
DT	.59544076	00	ESS2	-.14932725	03	F1	.10588959	06	F2	.14553781	06
ESS1	-.12572726	03	DOP	-.14334935	-07						
RF	.00000000	00									

0 DAYS 20 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.21133102

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.51823083	05	Y	-16587884	06	Z	-.73034158	05	DX	.81187173	00	DY	-.13971235	01	DZ	-.52346107	00
R	.18850838	06	DEC	-22794799	02	RA	.28734960	03	V	.16985586	01	PTH	.77056948	02	AZ	.70358209	02
R	.18850838	06	LAT	-22794799	02	LON	.17902684	03	VE	.12425759	02	PTE	.76559094	01	AZE	.27059498	03
XS	.12470706	09	YS	.77275734	08	ZS	.33508587	08	DXS	-.16174392	02	DYS	.22745845	02	DZS	.98621571	01
XM	-.82651826	04	YM	-.36212632	06	ZM	-.13075425	06	DXM	.10176376	01	DYM	.42938858	-01	DZM	-.52673476	-01
XT	-.82651826	04	YT	-.36212632	06	ZT	-.13075425	06	DXT	.10176376	01	DYT	.42938858	-01	DZT	-.52673476	-01
RS	.15048659	09	VS	.29601461	02	RM	.38509798	06	VM	.10190042	01	RT	.38509798	06	VT	.10190042	01
GED	-.22934117	02	ALT	.18213341	06	LOS	.28346199	03	RAS	.31784756	02	RAM	.26869250	03	LOM	.16036974	03
DUT	.34000000	02	DT	.19200000	04	DR	.16554037	01	SHA	.17920251	06	DES	.12865800	02	DEM	-.19848546	02

15

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 JEIGOLD-3  
 R .18850838 06  
 MIN .12000000 04 HA  
 CKM .34789791 03 CKC  
 UT .20000000 02 DHA  
 ET .19999055 02 RGE  
 RDI .63720164 04 PHI  
 DT .62690566 00 RFI  
 ESSI -.12617453 03 ESS2  
 RF .00000000 00 DOP

STATION PRINTS BK  
 UNIFORM TIME TAU .00000000 00  
 LAT -.22794799 02 LONG  
 .65735362 02 DEC  
 .28185824 03 CKT  
 .40962389-02 DDE  
 .18794161 06 DRG  
 .35116540 02 THI  
 .00000000 00 RFI  
 .14977453 03 F1  
 .30894901-09

.17902684 03  
 .41361755 01 AZI  
 .10964772 03 PSM  
 .27347776-02 DAZ  
 .48239894-07 SLS  
 .10971509 03 PUL  
 .14371992 06 PRA  
 .11254664 06  
 .23655941 03  
 .16970395 02  
 .25589416-02  
 .19757453 03  
 .32409099 03  
 .28578279 03

00MJET  
 R .18850838 06  
 MIN .12000000 04 HA  
 CKM .34942991 03 CKC  
 UT .20000000 02 DHA  
 ET .19999055 02 RGE  
 RDI .63725296 04 PHI  
 DT .61224271 00 RFI  
 ESSI -.12596896 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT -.22794799 02 LONG  
 .31662400 03 DEC  
 .28339024 03 CKT  
 .41661258-02 DDE  
 .18354577 06 DRG  
 .31210140 02 THI  
 .00000000 00 RFI  
 .14956896 03 F1  
 .53362188-07

.17902684 03  
 .50526430 02 AZI  
 .10689144 03 PSM  
 .35591314-02 DAZ  
 .83320751-05 SLS  
 .10695828 03 PUL  
 .14547582 06  
 .10903521 06  
 .87884074 02  
 .18431020 02  
 .23246631-02  
 .19736896 03  
 .16480163 03  
 .28858378 03

0 DAYS 21 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.25299768

APRIL 24, 1962 18 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .54725856 05  
 R .19440181 06  
 R .19440181 06  
 XS .12464879 09  
 XM -.46014791 04  
 XT -.46014791 04  
 RS .15048829 09  
 GED -.22797259 02  
 DUT .34000000 02

Y -.17084629 06  
 DEC -.22658589 02  
 LAT -.22658589 02  
 YS .77357606 08  
 YM -.36195515 06  
 YI -.36195515 06  
 VS .29601223 02  
 ALT .18802681 06  
 DT .19200000 04

Z -.74891195 05  
 RA .28776141 03  
 LON .16439758 03  
 ZS .33544084 08  
 ZM -.13093738 06  
 ZT -.13093738 06  
 RM .38493822 06  
 LOS .26846039 03  
 DR .16190834 01

DX .80084006 00  
 V .16605444 01  
 VE .12838074 02  
 DXS -.16191870 02  
 DXM .10177256 01  
 DXT .10177256 01  
 VM .10202551 01  
 RAS .31823922 02  
 SHA .18517289 06

DY -.13629363 01  
 PTH .77170382 02  
 PTE .72452179 01  
 DYS .22735116 02  
 DYM .52155428-01  
 DYT .52155428-01  
 RT .38493822 06  
 RAM .26927164 03  
 DES .12879516 02

DZ -.50839712 00  
 AZ .70186146 02  
 AZE .27056230 03  
 DZS .98574968 01  
 DZM -.49345921-01  
 DZI -.49345921-01  
 VT .10202551 01  
 LOM .14590781 03  
 DEM -.19886194 02

## JEIGOLD-3

R .19440181 06  
 MIN .12600000 04 HA  
 CKM .34809645 03 CKC  
 UT .21000000 02 DHA  
 ET .20999055 02 RGE  
 RDI .63720164 04 PHI  
 DT .65039323 00 RFI  
 ESSI -.12649400 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT -.22658589 02 LONG  
 .80439580 02 DEC  
 .28216627 03 CKT  
 .40728249-02 DDE  
 .19498301 06 DRG  
 .35116540 02 THI  
 .00000000 00 RFI  
 .15009400 03 F1  
 .33612577-07

.16439758 03  
 .61663758 01 AZI  
 .10934842 03 PSM  
 .29722860-02 DAZ  
 .52483326-05 SLS  
 .10941844 03 PUL  
 .14374940 06  
 .11248768 06  
 .24520157 03  
 .16707789 02  
 .22644985-02  
 .19789400 03  
 .33016680 03  
 .28611964 03



16

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 DDMJET 1  
 R .19440181 06  
 MIN .12600000 04 HA  
 CKM .34934952 03 CKC  
 UT .21000000 02 UHA  
 ET .20990055 02 RGE  
 RDI .63725296 04 PHI  
 DT .62940014 00 RFI  
 ESS1 .12620902 03 ESS2  
 RF .00000000 00 DDP

STATION PRINTS  
 UNIFORM TIME  
 LAT  
 TAU .00000000 00  
 BK  
 DEC  
 CKT  
 DDE  
 DRG  
 FHI  
 RF2  
 F1

LONG  
 ELE  
 PSS  
 DEL  
 DDR  
 SPS  
 BFI  
 F2

AZI  
 PSM  
 DAZ  
 SLS  
 PUL  
 PRA

.16439758 03  
 .63263790 02  
 .10692475 03  
 .34895007-02  
 .13125761-04  
 .10699345 03  
 .14535068 06  
 .10928545 06  
 .28858772 03

APRIL 24, 1962

JULIAN DATE 2437779.29466435

0 DAYS 22 HRS. 0 MIN. 0.000 SEC.

19 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .57589618 05 Y .17569445 06 Z .76695773 05 DX .79019763 00 DY .13308137 01 DZ .49429798 00  
 R .20016830 06 DEC .22529338 02 RA .28814825 03 V .16247486 01 PTH .77274305 02 AZ .70023224 02  
 R .20016829 06 LAT .22529338 02 LON .14974336 03 VE .13241926 02 PTE .68738288 01 AZE .27053289 03  
 XS .12459047 09 YS .77439436 08 ZS .33579554 08 DXS .16209340 02 DYS .22724378 02 DZS .98528323 01  
 XM .93763626 03 YM .36175079 06 ZM .13110952 06 DXM .10177210 01 DYM .61379223-01 DZM .46009426-01  
 XT .93763626 03 YT .36175079 06 ZT .13110952 06 DXT .10177210 01 DYT .61379223-01 DZT .46009426-01  
 RS .15048999 09 VS .29600985 02 RM .38477813 06 VM .10206078 01 RT .38477813 06 VT .10206078 01  
 GED .22667389 02 ALT .19379326 06 LOS .25345819 03 RAS .31863092 02 RAM .26985149 03 LOM .13144659 03  
 DUT .34000000 02 DT .19200000 04 DR .15848380 01 SHA .19101310 06 DES .12893325 02 DEM .19921999 02

## GEOCENTRIC

DDMJET 1  
 R .20016829 06  
 MIN .13200000 04 HA  
 CKM .34931561 03 CKC  
 UT .22000000 02 DHA  
 ET .21990055 02 RGE  
 RDI .63725296 04 PHI  
 DT .64711908 00 RFI  
 ESS1 .12645017 03 ESS2  
 RF .00000000 00 DDP

UNIFORM TIME  
 LAT  
 TAU .00000000 00  
 BK  
 DEC  
 CKT  
 DDE  
 DRG  
 FHI  
 RF2  
 F1

LONG  
 ELE  
 PSS  
 DEL  
 DDR  
 SPS  
 BFI  
 F2

AZI  
 PSM  
 DAZ  
 SLS  
 POL  
 PRA

.14974336 03  
 .75167808 02  
 .10700528 03  
 .29590777-02  
 .16279392-04  
 .10707588 03  
 .14517946 06  
 .10962786 06  
 .28853523 03

APRIL 24, 1962

JULIAN DATE 2437779.33633102

0 DAYS 23 HRS. 0 MIN. 0.000 SEC.

20 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .60415724 05 Y .18043037 06 Z .78451172 05 DX .77991775 00 DY .13005442 01 DZ .48106044 00  
 R .20581488 06 DEC .22406389 02 RA .28851273 03 V .15909450 01 PTH .77369855 02 AZ .69868185 02  
 R .20581488 06 LAT .22406390 02 LON .13506676 03 VE .13637748 02 PTE .65364107 01 AZE .27050631 03  
 XS .12453208 09 YS .77521227 08 ZS .33615027 08 DXS .16222680 02 DYS .22713628 02 DZS .98481628 01  
 XM .27260193 04 YM .36151321 06 ZM .13126914 06 DXM .10176235 01 DYM .70609444-01 DZM .42664262-01  
 XT .27260193 04 YT .36151321 06 ZT .13126914 06 DXT .10176235 01 DYT .70609444-01 DZT .42664262-01  
 RS .15049169 09 VS .29600748 02 RM .38461776 06 VM .10209620 01 RT .38461776 06 VT .10209620 01  
 GED .22543850 02 ALT .19943981 06 LOS .23845630 03 RAS .31902263 02 RAM .27043203 03 LOM .11698607 03  
 DUT .34000000 02 DT .19200000 04 DR .15524471 01 SHA .19673034 06 DES .12906928 02 DEM .19955953 02

17

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 I STATION PRINTS BK  
 DDMJET UNIFORM TIME TAU .0000000 00  
 R .20581488 06 LAT -22406390 02 LONG  
 MIN .13800000 04 HA .18718681 01 DEC -22126002 02 ELE  
 CKM .34974635 03 CKC .28360532 03 CKT .34932473 03 PSS  
 UT .23000000 02 DHA .41995329-02 DDE .33571301-04 DEL  
 ET .22999055 02 RGE .19952242 06 DRG .15647567 01 DDR  
 RDI .63754947 04 PHI .31210140 02 THI .13688502 03 SPS  
 DT .66553507 00 RFI .00000000 00 RF2  
 ESS1 -12669390 03 ESS2 -15029390 03 F1  
 RF .00000000 00 DOP -11260047-06  
 .135066676 03 AZI .34913305 03  
 .80763686 02 PSM .17268173 02  
 .10710282 03 DAZ -.23830001-01  
 .71017838-03 SLS .19809390 03  
 .15647567 04 POL .87285337 02  
 .10717539 03 PRA  
 .14498242 06  
 .11002190 06  
 .28845911 03

JORJET I UNIFORM TIME TAU .0000000 00  
 R .20581488 06 LAT -22406390 02 LONG  
 MIN .13800000 04 HA .25098282 03 DEC -21506276 02 ELE  
 CKM .34974635 03 CKC .28402694 03 CKT .34974635 03 PSS  
 UT .23000000 02 DHA .40525793-02 DDE -.12941171-04 DEL  
 ET .22999055 02 RGE .20644364 06 DRG .11938747 01 DDR  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS  
 DT .68862176 00 RFI .00000000 00 RF2  
 ESS1 -12699010 03 ESS2 -15059010 03 F1  
 RF .00000000 00 DOP -11356338-06  
 .135066676 03 AZI .11770397 03  
 -.65409664 01 PSM .17705761 02  
 .10546305 03 DAZ -.19430895-02  
 .32387795-02 SLS .19839010 03  
 -.17732005-04 POL .15706034 03  
 .10553878 03 PRA  
 .14617025 06  
 .10764648 06  
 .29014792 03

1 DAYS 0 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.37799768

APRIL 24, 1962 21 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .63205444 05 Y -.14506037 06 Z -.80160331 05 DX .76997578 00 DY -.12719464 01 DZ -.46859648 00  
 R .21134793 06 DEC -.22289175 02 RA .28885707 03 V .15589397 01 PTH .77458014 02 AZ .69719937 02  
 R .21134793 06 LAT -.22289175 02 LON .12037003 03 VE .14025933 02 PTE .62285476 01 AZE .27048217 03  
 XS .12447363 09 YS .77602986 08 ZS .33650474 08 DXS -.16244257 02 DYS .22702866 02 DZS .98434883 01  
 XM .63891708 04 YM -.36124240 06 ZM -.13141659 06 DXM .10174330 01 DYM .79845317-01 DZM -.39310692-01  
 XT .63891708 04 YT -.36124240 06 ZT -.13141659 06 DXT .10174330 01 DYT .79845317-01 DZT -.39310692-01  
 RS .15049339 09 VS .29600511 02 RM .38445707 06 VM .10213180 01 RT .38445707 06 VT .10213180 01  
 GED -.22426069 02 ALT .20497283 06 LGS .22345441 03 RAS .31941441 02 RAM .27101326 03 LOM .10252623 03  
 DUT .34000000 02 DT .19200000 04 DR .15217390 01 SHA .20233115 06 DES .12920626 02 DEM -.19988046 02

DDMJET I UNIFORM TIME TAU .0000000 00  
 R .21134793 06 LAT -22289175 02 LONG  
 MIN .14400000 04 HA .16981372 02 DEC -21988872 02 ELE  
 CKM .34937050 03 CKC .28375276 03 CKT .34937050 03 PSS  
 UT .24000000 02 DHA .41933513-02 DDE .42381454-04 DEL  
 ET .23999055 02 RGE .20526918 06 DRG .15275240 01 DDR  
 RDI .63725296 04 PHI -.31210140 02 THI .13688502 03 SPS  
 DT .68470419 00 RFI .00000000 00 RF2  
 ESS1 -12694055 03 ESS2 -15054054 03 F1  
 RF .00000000 00 DOP -110871124-06  
 .12037003 03 AZI .29721977 03  
 .72269469 02 PSM .16838060 02  
 .10718891 03 DAZ -.32135309-02  
 .32135309-02 SLS .19834054 03  
 .16974382-04 POL .42223158 02  
 .10726354 03 PRA  
 .14478140 06  
 .11042390 06  
 .28839068 03

61

**CASE 1**

## SPACE TRAJECTORIES

RANGER-4 ORBIT 042362

STATION PRINTS BK

1 DAYS 2 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.46133102

APRIL 24, 1962 23 04 19.000

**GEOCENTRIC**

EQUATORIAL COORDINATES

X	-68680322	05	Y	-19402505	06	Z	-83450271	05	DX	75101575	00	DY	-12191626	01	DZ	-44569748	00
R	22209605	06	DEC	-22070029	02	RA	28949277	03	V	14996761	01	PTH	77615504	02	AZ	69440062	02
R	22209605	06	LAT	-22070029	02	LOn	90923631	02	VE	14780821	02	PTE	56873474	01	AZE	27044002	03
XS	12436654	09	YS	77766374	08	ZS	33721315	08	DXS	16279143	02	DYS	22681312	02	DZS	98341262	01
XM	13712554	05	YM	-36060098	06	ZM	-13167551	06	DXM	10167718	01	DYM	98330548	-01	DZM	-32579533	-01
XT	13712554	05	YT	-36060098	06	ZT	-13167551	06	DXT	10167718	01	DYT	98330548	-01	DZT	-32579533	-01
RS	15049679	09	VS	29600041	02	RM	38413479	06	VM	10220348	01	RT	38413479	06	VT	10220348	01
GD	-22205858	02	ALT	21572089	06	LOS	19345064	03	RAS	32019803	02	RAM	27217773	03	LOM	73608566	02
WED	34000000	02	DT	19202000	04	DK	14647731	01	SHA	21320659	06	DES	12948000	02	DEM	-20046620	02

COMJET

UNIFORM TIME TAU .00000000 00

NAME	22209605	06	LAT	-22070029	02	LONG	
HA	.15600000	04	.47072414	02	DEC	-221634912 02	
MIN	.34953573	03	.28411478	03	CKI	.34953573 03	
CKM	.26000000	02	DHA	.41617554	-02	DDE	.54524394 -04
UT	.25999055	02	RGE	.21738570	06	DRG	.17304316 01
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502 03
DTI	.72512055	00	KFI	.00000000	00	RF2	.00000000 00
ESSI	-.12743869	03	E552	-.15103869	03	F1	.106993666 06
RF	.00000000	00	UOP	-.67652045	-07		

**JOBJET**

UNIFORM TIME TAU .0000000 00

	.22209605	06	LAT	- .22070029	02	LONG
MIN	.15600000	04	HA	.29531581	03 DEC	EL
CKRM	.34918003	03	CKC	.28376508	03 KCT	PS
UT	.26000000	02	DHA	.41536495	-02 DDE	DE
EJ	.25999055	02	RGE	.21872534	06 DRG	DU
RDI	.63754947	04	PHI	-.25734820	02 THI	SP
DT	.72958910	00	RFI	.00000000	00 RF2	BF
ESS1	-.12749205	03	ESS2	-.15109205	03 F1	F2
REF	.00000000	00	DOP	-.26758987	-07	

1 DAYS 3 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.50299768

APRIL 25, 1962 00 04 19.000

## GEOCENTRIC

EQUATORIAL COORDINATES

X	71367603	05	Y	-19836968	06	Z	-85035607	05	DX	74195728	00	DY	-11947235	01	DZ	-43514049	00
R	22732118	06	DEC	-21967272	02	RA	28978724	03	V	14721454	01	PTH	77686283	02	AZ	69306788	02
R	22732117	06	LAT	-21967273	02	LON	76167957	02	VE	15148169	02	PIE	54482890	01	AZE	27042152	03
XS	12429790	09	YS	77848014	08	ZS	33756713	08	DXS	16296576	02	DYS	22670517	02	DZS	98294374	01
XM	17372139	05	YM	-36023034	06	ZM	-13178672	06	DXM	10163009	01	DYM	10757798	00	DZM	-29202703	-01
XT	17372139	05	YT	-36023034	06	ZT	-13178672	06	DXT	10163009	01	DYT	10757798	00	DZT	-29202703	-01
R	15049849	09	VS	22959807	02	RM	38397321	06	VM	10223959	01	RT	38397321	06	VT	10223959	01
GED	-22102601	02	ALT	22094599	06	LOS	17844871	03	RAS	32058991	02	RAM	292766095	03	LWM	59150674	02
UT	34000000	02	DT	19200000	04	DR	14382780	01	SHA	21849150	06	DES	12961680	02	DEM	-20073085	02

20

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 DDMJET 1  
 R .22732117 06  
 MIN .16200000 04 HA  
 CKM .34963414 03 CKC  
 UT .27000000 02 DHA  
 ET .26999055 02 RGE  
 RDI .63725296 04 PHI  
 DT .74609268 00 RFI  
 ESS1 -.12768634 03 ESS2  
 RF .00000000 00 DOP

STATION PRINTS BK  
 UNIFORM TIME TAU .00000000 00  
 LAT .22732117 06 LONG  
 DEC .62016243 02 DEC  
 CKT .28430865 03 CKT  
 DDE .41399497-02 DDE  
 DRG .22367299 06 DRG  
 THI .31210140 02 THI  
 RFI .00000000 00 RFI  
 F1 .15128634 03 F1  
 F2 .13703981 06 F2  
 DOP -.34225433-07

76176967 02  
 .34257241 02 AZI  
 .10715679 03 PSM  
 -.35446960-02 DAZ  
 .53440250-05 SLS  
 .10723812 03 PDL  
 .14435912 06  
 .11126837 06 PRA  
 .28847906 03

JOBJET 1  
 R .22732117 06  
 MIN .16200000 04 HA  
 CKM .34905842 03 CKC  
 UT .27000000 02 DHA  
 ET .26999055 02 RGE  
 RDI .63754947 04 PHI  
 DT .74318171 00 RFI  
 ESS1 -.12765238 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT .22732117 06 LONG  
 DEC .31031761 03 DEC  
 CKT .28373292 03 CKT  
 DDE .41797068-02 DDE  
 DRG .22280030 06 DRG  
 THI .25734820 02 THI  
 RFI .00000000 00 RFI  
 F1 .15125238 03 F1  
 F2 .10514125 06 F2  
 DOP -.68763512-07

76176967 02  
 .44586674 02 AZI  
 .10488698 03 PSM  
 .37469341-02 DAZ  
 .10736867-04 SLS  
 .10496892 03 PDL  
 .14631885 06 PRA  
 .10734931 06  
 .29097744 03

1 DAYS 4 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.54466435

APRIL 25, 1962 01 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .74022740 05 Y -.20262845 06 Z -.86583907 05 DX .73315524 00 DY -.11714440 01 DZ -.42511014 00  
 R .23245306 06 DEC -.21868591 02 RA .29006789 03 V .14458618 01 PTH .77752604 02 AZ .69176964 02  
 LAT .23245306 06 LAT -.21868591 02 LUN .61416543 02 VE .15509179 02 PTE .52271488 01 AZE .27040448 03  
 XS .12423920 09 YS .77929613 08 ZS .33792092 08 DXS -.16314000 02 DYS .22659712 02 DZS .98247445 01  
 XM .21029844 05 YM -.35982640 06 ZM -.13188576 06 DXM .10157360 01 DYM .11682800 00 DZM -.25818425-01  
 XT .21029844 05 YT -.35982640 06 ZT -.13188576 06 DXT .10157360 01 DYT .11682800 00 DZT -.25818425-01  
 RS .15050019 09 VS .29599574 02 RM .38381134 06 VM .10227585 01 RT .38381134 06 VT .10227585 01  
 GED -.22003435 02 ALT .22607785 06 LOS .16344683 03 RAS .32029818 02 RAM .27334481 03 LOM .44693466 02  
 DUT .34000000 02 DT .19200000 04 DR .14129550 01 SHA .22368073 06 UES .12975352 02 DEM -.20097658 02

DDMJET 1  
 R .23245306 06  
 MIN .16800000 04 HA  
 CKM .34972889 03 CKC  
 UT .28000000 02 DHA  
 ET .27999055 02 RGE  
 RDI .63725296 04 PHI  
 DT .76729294 00 RFI  
 ESS1 -.12792971 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT .23245306 06 LONG  
 DEC .76878382 02 DEC  
 CKT .28449710 03 CKT  
 DDE .41167142-02 DDE  
 DRG .23002867 06 DRG  
 THI .31210140 02 THI  
 RFI .00000000 00 RFI  
 F1 .15152971 03 F1  
 F2 .10706752 06 F2  
 DOP -.43912023-08

.61416543 02  
 .21629114 02 AZI  
 .10700439 03 PSM  
 -.34639648-02 DAZ  
 -.68565080-06 SLS  
 .10708810 03 PDL  
 .14433170 06  
 .11132320 06 PRA  
 .28865798 03

21

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 I STATION PRINTS BK  
 JOBJET I UNIFORM TIME LAT LONG  
 R .23245306 06 HA .32540208 03 DEC -.21868591 02 .61416543 02  
 MIN .16800000 04 HA .32540208 03 DEC -.21868591 02 .58150116 02  
 CKM .34896933 03 CKC .28373753 03 CKT .34896933 03 PSS .10496764 03 PSM .16264397 02  
 UT .28000000 02 DHA .41993983-02 DDE .44934785-05 DEL .37817677-02 DAZ -.18267829-02  
 ET .27999055 02 RGE .22701315 06 DRG .11962174 01 DDR .16106477-04 SLS .19921509 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10505109 03 POL .17403882 03  
 DT .75723426 00 RFI .00000000 00 RF2 .00000000 00 BFI .14616275 06  
 ESS1 -.12781509 03 ESS2 -.15141509 03 F1 .13529369 06 F2 .10766149 06 PRA .29093404 03  
 RF .00000000 00 DOP -.10315280-06

1 DAYS 5 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.58633102

APRIL 25, 1962 02 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .76646623 05 Y -.20680535 06 Z -.88096979 05 DX .72459295 00 DY -.11492337 01 DZ -.415556305 00  
 R .23749576 06 DEC -.21773680 02 RA .29033582 03 V .14207271 01 PTH .77815036 02 AZ .69049914 02  
 R .23749576 06 LAT -.21773680 02 LON .46643402 02 VE .15864418 02 PTE .50220109 01 AZE .27038873 03  
 XS .12418043 09 YS .78011172 08 ZS .33827454 08 DXS -.16331417 02 DYS .22648896 02 DZS .98200470 01  
 XM .24685348 05 YM -.35938917 06 ZM -.13197250 06 DXM .10150770 01 DYM .12607949 00 DZM -.22427186-01  
 XT .24685348 05 YT -.35938917 06 ZT -.13197250 06 DXT .10150770 01 DYT .12607949 00 DZT -.22427186-01  
 RS .15050189 09 VS .24399341 02 RM .38364920 06 VM .16231228 01 RT .36364920 06 VT .10231228 01  
 GED -.21908057 02 ALT .23112052 06 LOS .14884496 03 RAS .32137374 02 RAM .27392930 03 LOM .30236883 02  
 DUT .34000000 02 DT .19200000 04 DR .13887200 01 SHA .22877842 06 DES .12989018 02 DEM -.20120330 02

## OOMJET

R .23749576 06 I UNIFORM TIME TAU .00000000 00  
 MIN .17400000 04 HA .91657053 02 DEC -.21022232 02 ELE .46643402 02  
 CKM .34981040 03 CKC .28467072 03 CKT .34981040 03 PSS .10677452 03 PSM .14899719 02  
 UT .29000000 02 DHA .40938625-02 DDE .55480104-04 DEL -.33388256-02 DAZ -.18847872-02  
 ET .28999055 02 RGE .23637507 06 DRG .17540015 01 DDR -.70778582-05 SLS .19956610 03  
 RDI .63725296 04 PHI -.31210140 02 THI .13688502 03 SPS .10686065 03 POL .37746852 02  
 DT .78846224 00 RFI .00000000 00 RF2 .00000000 00 BFI .14437633 06  
 ESS1 -.12816610 03 ESS2 -.15176610 03 F1 .13702595 06 F2 .11123396 06 PRA .28892038 03  
 RF .00000000 00 DOP .45329645-07

## JOBJET

R .23749576 06 I UNIFORM TIME TAU .00000000 00  
 MIN .17400000 04 HA .34054443 03 DEC -.21635291 02 ELE .46643402 02  
 CKM .34892023 03 CKC .28378054 03 CKT .34892023 03 PSS .10509717 03 PSM .15834050 02  
 UT .29000000 02 DHA .42117322-02 DDE .13198632-04 DEL .37445684-02 DAZ -.36463103-02  
 ET .28999055 02 RGE .23143300 06 DRG .12615229 01 DDR .19880302-04 SLS .19938257 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10518220 03 POL .17147162 03  
 DT .77197729 00 RFI .00000000 00 RF2 .00000000 00 BFI .14595360 06  
 ESS1 -.12798257 03 ESS2 -.15158257 03 F1 .10548770 06 F2 .10807975 06 PRA .29083276 03  
 RF .00000000 00 DOP -.12732199-06

22

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK

1 DAYS 6 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.62799768

APRIL 25, 1962 03 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.79240097	05	Y	-.21090410	06	Z	-.89576489	05	DX	.71625488	00	DY	-.11280128	01	DZ	-.40646103	00
R	.24245305	06	DEC	-.21682263	02	RA	.29059201	03	V	.13966547	01	PTH	.77874104	02	AZ	.68924990	02
R	.24245305	06	LAT	-.21682263	02	LON	.31858535	02	VE	.16213235	02	PTE	.48312250	01	AZE	.27037415	03
XS	.12412160	09	YS	.78092693	08	ZS	.33862800	08	DXS	-.16348826	02	DYS	.22638069	02	DZS	.98153442	01
XM	.28338320	05	YM	-.35891863	06	ZM	-.13204722	06	DXM	.10143237	01	DYM	.13533162	00	DZM	-.19029269	-01
XT	.28338320	05	YT	-.35891863	06	ZT	-.13204722	06	DXT	.10143237	01	DYT	.13533162	00	DZT	-.19029269	-01
RS	.15050359	09	VS	.29599109	02	RM	.38348678	06	VM	.10234888	01	RT	.38348678	06	VT	.10234888	01
GED	-.21816190	02	ALT	.23607779	06	LOS	.13344339	03	RAS	.32176572	02	RAM	.27451440	03	LOM	.15780922	02
DUT	.34000000	02	DT	.19200000	04	DR	.13654931	01	SHA	.23378843	06	DES	.13002680	02	DEM	-.20141095	02

## DOMJET

R	.24245305	06	I	UNIFORM TIME	TAU	.00000000	00	LAT	-.21682263	02	LONG	.31858535	02	AZI	.24384023	03	
MIN	.18000000	04	HA	.10635656	03	DEC	-.20829013	02	ELE	-.23418541	01	PSS	.10647205	03	PSM	.14585576	02
CKM	.34987066	03	CKC	.28482168	03	CKT	.34987066	03	PSS	.10647205	03	DEL	-.31560990	-02	DAZ	-.21305470	-02
UT	.30000000	02	DHA	.40729771	-02	DDE	.51566494	-04	DDR	-.13387373	-04	SPS	.10656059	03	POL	.42746359	02
ET	.29999055	02	RGE	.24262981	05	DRG	.17170744	01	DDR	-.13387373	-04	SPS	.10656059	03	POL	.42746359	02
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10656059	03	BF1	.14449459	06	PRA	.28926194	03
DT	.80932584	00	RF1	.00000000	00	RF2	.00000000	00	BF1	.14449459	06	PRA	.28926194	03	PRA	.28926194	03
ESS1	-.12839295	03	ESS2	-.15199295	03	F1	.10690123	06	F2	.11099745	06	PRA	.28926194	03	PRA	.28926194	03
RF	.00000000	00	DOP	.85738491	-07												

## JOBJET

R	.24245305	06	I	UNIFORM TIME	TAU	.00000000	00	LAT	-.21682263	02	LONG	.31858535	02	AZI	.44178047	02	
MIN	.18000000	04	HA	.35571717	03	DEC	-.21571524	02	ELE	.84280587	02	PSM	.15379318	02	PSM	.15379318	02
CKM	.34890971	03	CKC	.28386072	03	CKT	.34890971	03	PSS	.10525002	03	DEL	.26304216	-02	DAZ	-.29177551	-01
UT	.30000000	02	DHA	.42162654	-02	DDE	.22216084	-04	DDR	.21773209	-04	SLS	.19955630	03	POL	.14058382	03
ET	.29999055	02	RGE	.23610846	06	DRG	.13370919	01	DDR	.21773209	-04	SLS	.19955630	03	POL	.14058382	03
RDI	.63754947	04	PHI	-.25734820	02	THI	.27684780	02	SPS	.10533670	03	BF1	.14571157	06	PRA	.29070109	03
DT	.78757293	00	RF1	.00000000	00	RF2	.00000000	00	BF1	.14571157	06	PRA	.29070109	03	PRA	.29070109	03
ESS1	-.12815630	03	ESS2	-.15175630	03	F1	.10573715	06	F2	.10856375	06	PRA	.29070109	03	PRA	.29070109	03
RF	.00000000	00	DOP	-.13944499	-06												

1 DAYS 7 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.66966435

APRIL 25, 1962 04 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.81803926	05	Y	-.21492815	06	Z	-.91023987	05	DX	.70812635	00	DY	-.11077110	01	DZ	-.39777037	00
R	.24732843	06	DEC	-.21594099	02	RA	.29083735	03	V	.13735676	01	PTH	.77930319	02	AZ	.68801570	02
R	.24732843	06	LAT	-.21594100	02	LON	.17062809	02	VE	.16556765	02	PTE	.46533583	01	AZE	.27036059	03
XS	.12406271	09	YS	.78174175	08	ZS	.33898127	08	DXS	-.16366227	02	DYS	.22627231	02	DZS	.98106372	01
XM	.31988395	05	YM	-.35841478	06	ZM	-.13210950	06	DXM	.10134761	01	DYM	.14458348	00	DZM	-.15624995	-01
XT	.31988395	05	YT	-.35841478	06	ZT	-.13210950	06	DXT	.10134761	01	DYT	.14458348	00	DZT	-.15624995	-01
RS	.15050529	09	VS	.29598877	02	RM	.38332409	06	VM	.10238566	01	RT	.38332409	06	VT	.10238566	01
GED	-.21727590	02	ALT	.24095315	06	LOS	.11844123	03	RAS	.32215773	02	RAM	.27510011	03	LOM	.13255653	01
DUT	.34000000	02	DT	.19200000	04	DR	.13432035	01	SHA	.23871431	06	DES	.13016333	02	DEM	-.20159946	02

23

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 1 STATION PRINTS BK  
 JOBJET I UNIFORM TIME LAT LONG  
 R .24732843 06 --.21594100 02  
 MIN .18600000 04 HA .10892356 02 DEC --.21475857 02 ELE  
 CKM .34893360 03 CKC .28397403 03 CKT .34893360 03 PSS  
 UT .31000000 02 DHA .42131674-02 DDE .30800632-04 DEL  
 ET .30999055 02 RGE .24106392 06 DRG .14158689 01 DDR  
 RDI .63754947 04 PHI --.25734820 02 THI .27684780 02 SPS  
 DT .80410257 00 RFI .00000000 00 RF2 .14545927 06  
 ESS1 --.12833671 03 ESS2 --.15193671 03 F1  
 RF .00000000 00 DDP --.13868493-06

1 DAYS 8 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.71133102

APRIL 25, 1962 05 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .84338860 05 Y --.21888065 06 Z --.92440889 05 DX .70019384 00 DY --.10882662 01 DZ --.38946117 00  
 R .25212516 06 DEC --.21508965 02 RA .29107252 03 V .13513973 01 PTH .77984153 02 AZ .68679023 02  
 R .25212516 06 LAT --.21508965 02 LON .22570095 01 VE .16894924 02 PTE .44871678 01 AZE .27034797 03  
 XS .12400376 09 YS .78255621 08 ZS .33933440 08 DXS --.16383621 02 DYS .22616381 02 DZS .98059252 01  
 XM .35635263 05 YM --.35787763 06 ZM --.13215971 06 DXM .10125339 01 DYM .15383429 00 DZM --.12214629-01  
 XT .35635263 05 YT --.35787763 06 ZT --.13215971 06 DXT .10125339 01 DYT .15383429 00 DZT --.12214629-01  
 RS .15050699 09 VS .23598646 06 RM .38316114 06 VM .10242261 01 RT .38316114 06 VT .10242261 01  
 GED --.21642034 02 ALT .24574986 06 LOS .10343937 03 RAS .32254979 02 RAM .27568641 03 LDM .34687080 03  
 DUT .34000000 02 DT .19200000 04 DR .13217883 01 SHA .24355594 06 DES .13029982 02 DEM --.20176876 02

## JOBJET

R .25212516 06 I UNIFORM TIME TAU .00000000 00  
 MIN .19200000 04 HA .26043702 02 DEC --.21508965 02 LONG .22570095 01  
 CKM .34898527 03 CKC .28411404 03 CKT .34898527 03 PSS .10552487 03  
 UT .32000000 02 DHA .42031963-02 DDE .38277223-04 DEL --.37824416-02 DAZ .24601223-02  
 ET .31999055 02 RGE .24629787 06 DRG .14906280 01 DDR .19561085-04 SLS .19992328 03  
 RDI .63754947 04 PHI --.25734820 02 THI .27684780 02 SPS .10561517 03  
 DT .82156114 00 RFI .00000000 00 RF2 .00000000 00 BFI .14521984 06  
 ESS1 --.12852328 03 ESS2 --.15212323 03 F1 .10620832 06 F2 .10954712 06  
 RF .00000000 00 DDP --.12527759-06

1 DAYS 9 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.75299768

APRIL 25, 1962 06 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .86845562 05 Y --.22276462 06 Z --.93828528 05 DX .69244432 00 DY --.10696231 01 DZ --.38150694 00  
 R .25684629 06 DEC --.21426663 02 RA .29129850 03 V .13300828 01 PTH .78036076 02 AZ .68556736 02  
 R .25684628 06 LAT --.21426664 02 LON .34744181 03 VE .17227921 02 PTE .43315624 01 AZE .27033619 03  
 XS .12394474 09 YS .78337023 08 ZS .33968734 08 DXS --.16401006 02 DYS .22605521 02 DZS .98012087 01  
 XM .39278558 05 YM --.35730718 06 ZM --.13219754 06 DXM .10114970 01 DYM .16308314 00 DZM --.87984965-02  
 XT .39278558 05 YT --.35730718 06 ZT --.13219754 06 DXT .10114970 01 DYT .16308314 00 DZT --.87984965-02  
 RS .15050868 09 VS .29598416 06 RM .38299793 06 VM .10245973 01 RT .38299793 06 VT .10245973 01  
 GED --.21559323 02 ALT .25047097 06 LOS .88437504 02 RAS .32294187 02 RAM .27627330 03 LDM .33241661 03  
 DUT .34000000 02 DT .19200000 04 DR .13011912 01 SHA .24833267 06 DES .13043623 02 DEM --.20191876 02

24

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 JOBJET 1  
 R .25684628 06  
 MIN .19800000 04 HA  
 CKM .34905634 03 CKC  
 UT .33000000 02 DHA  
 ET .32990055 02 RGE  
 RDI .63754947 04 PHI  
 DT .83985895 00 RFI  
 ESS1 -.12871461 03 ESS2  
 RF .00000000 00 DOP  
 STATION PRINTS BK  
 UNIFORM TIME TAU .00000030 00  
 LAT -.21426664 02 LONG  
 .41148605 02 DEC  
 .28427253 03 CKT  
 .41875993-02 DDE  
 .25178341 06 DRG  
 -.25734820 02 THI  
 .00000000 00 RFI  
 .15231461 03 F1  
 .10047926-06  
 .34744181 03  
 .52132968 02 AZI  
 .10560287 03 PSM  
 -.37815064-02 DAZ  
 .15689025-04 SLS  
 .10569514 03 POL  
 .14501505 06 PRA  
 .10995664 06  
 .26804308 03  
 .13978067 02  
 -.15832240-02  
 .20011461 03  
 .23285338 02  
 .29039286 03

APRIL 25, 1962 07 04 19.000

JULIAN DATE 2437779.79466435

1 DAYS 10 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .89324679 05 Y -.22658283 06 Z -.95188136 05 DX .68486566 00 DY -.10517330 01 DZ -.37388411 00  
 R .26149466 06 DEC -.21347013 02 RA .29151561 03 V .13095696 01 PIH .78086541 02 AZ .68434073 02  
 R .26149466 06 LAT -.21347014 02 LON .33261786 03 VE .17555947 02 PTE .41855885 01 AZE .27032517 03  
 XS .12388567 09 YS .78418387 08 ZS .34004011 08 DXS -.16418384 02 DYS .22594650 02 DZS .97964875 01  
 XM .42917950 05 YM -.35670343 06 ZM -.13222305 06 DXM .10103652 01 DYM .17232919 00 DZM -.53768867-02  
 XT .42917950 05 YT -.35670343 06 ZT -.13222305 06 DXT .10103652 01 DYT .17232919 00 DZT -.53768867-02  
 RS .15051038 09 VS .29598187 02 RM .38283446 06 VM .10249702 01 RT .38283446 06 VT .10249702 01  
 XG .21479276 02 ALT .25511932 06 LOS .73435649 02 RAS .32333398 02 RAM .27686075 03 LOM .31796300 03  
 DUT .34000000 02 DT .19200000 04 DR .12813621 01 SHA .25301937 06 DES .13057260 02 DEM -.20204443 02

JOBJET 1  
 R .26149466 06  
 MIN .20400000 04 HA  
 CKM .34913732 03 CKC  
 UT .34000000 02 DHA  
 ET .33999055 02 RGE  
 RDI .63754947 04 PHI  
 DT .85882973 00 RFI  
 ESS1 -.12890862 03 ESS2  
 RF .00000000 00 DOP  
 UNIFORM TIME TAU .00000000 00  
 LAT -.21347014 02 LONG  
 .56189563 02 DEC  
 .28444019 03 CKT  
 .41679600-02 DDE  
 .25747071 06 DRG  
 -.25734820 02 THI  
 .00000000 00 RFI  
 .15250862 03 F1  
 -.66394097-07  
 .33261786 03  
 .38587476 02 AZI  
 .10561917 03 PSM  
 -.37388485-02 DAZ  
 .10366902-04 SLS  
 .10571353 03 POL  
 .14486364 06 PRA  
 .11025943 06  
 .26280952 03  
 .13528414 02  
 -.13760301-02  
 .20030862 03  
 .25028053 02  
 .29039297 03

APRIL 25, 1962 08 04 19.000

JULIAN DATE 2437779.83633102

1 DAYS 11 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .91776808 05 Y -.230333794 06 Z -.96520853 05 DX .67744620 00 DY -.10345526 01 DZ -.36657167 00  
 R .26607297 06 DEC -.21269847 02 RA .29172452 03 V .12898090 01 PIH .78136020 02 AZ .68310371 02  
 R .26607296 06 LAT -.21269847 02 LON .31778570 03 VE .17879188 02 PTE .40484050 01 AZE .27031484 03  
 XS .12382652 09 YS .78499715 08 ZS .34039273 08 DXS -.16433575 02 DYS .22583766 02 DZS .97917611 01  
 XM .46553108 05 YM -.35606641 06 ZM -.13223624 06 DXM .10091383 01 DYM .18157161 00 DZM -.19500905-02  
 XT .46553108 05 YT -.35606641 06 ZT -.13223624 06 DXT .10091383 01 DYT .19157161 00 DZT -.19500905-02  
 RS .15051208 09 VS .29597958 02 RM .38267075 06 VM .10253449 01 RT .38267075 06 VT .10253449 01  
 XG .21401723 02 ALT .25969760 06 LOS .584333796 02 RAS .32372615 02 RAM .27744876 03 LOM .30350994 03  
 DUT .34000000 02 DT .19200000 04 DR .12622557 01 SHA .25763988 06 DES .13070889 02 DEM -.20216069 02



25

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 JETGOLD-3 1 UNIFORM TIME TAU .00000000 00  
 R .26607296 06 LAT -.21269847 02 LONG  
 MIN .21000000 04 HA .28424219 03 DEC -.22109251 02 ELE .31778570 03  
 CKM .34759380 03 CKC .28298284 03 CKT .34759380 03 PSS .10351852 03 PSM .11605166 03  
 UT .35000000 02 DHA .41483018-02 DDE -.43862604-05 DEL .30458134-02 DAZ .23449352-02  
 ET .34999055 02 RGE .26618828 06 DRG .92379461 00 DDR .90437861-06 SLS .20059785 03  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .226333764 03  
 DT .88790839 00 RFI .00000000 00 RF2 .00000000 00 BFI .14703524 06  
 ESS1 -.12919785 03 ESS2 -.15279785 03 F1 .10591668 06 PRA .29289202 03  
 RF .00000000 00 DDP -.57920292-08 F2 .10444835 06

JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .26607296 06 LAT -.21269847 02 LONG  
 MIN .21000000 04 HA .71155158 02 DEC -.20859609 02 ELE .31778570 03  
 CKM .34921848 03 CKC .28460752 03 CKT .34921848 03 PSS .10556410 03 PSM .13097089 02  
 UT .35000000 02 DHA .41460236-02 DDE .49630070-04 DEL -.36683033-02 DAZ -.13791377-02  
 ET .34999055 02 RGE .26329125 06 DRG .16279752 01 DDR .40173430-05 SLS .20050280 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 03 SPS .10566061 03 POL .27860398 02  
 DT .87824497 00 RFI .00000000 00 RF2 .00000000 00 BFI .14477995 06 PRA .29046844 03  
 ESS1 -.12910280 03 ESS2 -.15270280 03 F1 .10663792 06 F2 .11042679 06

1 DAYS 12 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437779.87799768

APRIL 25.1962 09 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .94202491 05 Y -.23403241 06 Z -.97827796 05 DX .67017471 00 DY -.10180442 01 DZ -.35955102 00  
 R .27058373 06 DEC -.21195019 02 RA .29192572 03 V .12707577 01 PTH .78184987 02 AZ .68184914 02  
 R .27058373 06 LAT -.21195019 02 LON .30294584 03 VE .18197817 02 PTE .39192675 01 AZE .27030514 03  
 XS .12376732 09 YS .78581000 08 ZS .34074516 08 DXS -.16453118 02 DYS .22572873 02 DZS .97870305 01  
 XM .50183666 05 YM -.35539611 06 ZM -.13223708 06 DXM .10078164 01 DYM .19080947 00 DZM .14815653-02  
 XT .50183666 05 YT -.35539611 06 ZT -.13223708 06 DXT .10078164 01 DYT .19080947 00 DZT .14815653-02  
 RS .15051377 09 VS .29597730 02 RM .38250679 06 VM .10257214 01 RT .38250679 06 VT .10257214 01  
 GED -.21326520 02 ALT .26420834 06 LOS .43431950 02 RAS .32411833 02 RAM .27803731 03 LOM .28905742 03  
 DUT .34000000 02 DT .19200000 04 DR .12438351 01 SHA .26219088 06 DES .13084512 02 DEM -.20225248 02

## JETGOLD-3

R .27058373 06 LAT -.21195019 02 LONG  
 MIN .21000000 04 HA .29921633 03 DEC -.22120209 02 ELE .30294584 03  
 CKM .34748340 03 CKC .28295831 03 CKT .34748340 03 PSS .10349998 03 PSM .13367692 02  
 UT .36000000 02 DHA .41701674-02 DDE -.13995166-05 DEL .27900528-02 DAZ .27040505-02  
 ET .35999055 02 RGE .26953381 06 DRG .93865605 00 DDR .72599148-05 SLS .20070633 03  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .10359970 03 POL .23258298 03  
 DT .89906791 00 RFI .00000000 00 RF2 .00000000 00 BFI .14698764 06 PRA .29295894 03  
 ESS1 -.12930634 03 ESS2 -.15290633 03 F1 .10448992 06 F2 .10601187 06

26

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 1 STATION PRINTS BK  
 JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .27058373 06 LAT .21195019 02 LONG .30294584 03  
 MIN .21600000 04 HA .86040271 02 DEC -.20681129 02 ELE .12212893 02 AZI .25273436 03  
 CKM .34929057 03 CKC .28476548 03 CKT .34929057 03 PSS .10543386 03 PSM .12686300 02  
 UT .36000000 02 DHA .41235338-02 DDE .43179693-04 DEL .35664885-02 DAZ -.15055743-02  
 ET .35999055 02 RGE .26916327 06 DRG .16301049 01 DDR -.28857051-05 SLS .20069438 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10553258 03 PUL .31594965 02  
 DT .89783189 00 RFI .00000000 00 RF2 .00000000 00 BF1 .14477313 06  
 ESS1 -.12929438 03 ESS2 -.15289438 03 F1 .13663792 06 F2 .11044043 06 PRA .29062439 03  
 RF .00000000 00 DOP .18481296-07

1 DAYS 13 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437779.91966435 APRIL 25, 1962 10 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .96602245 05 Y -.23766861 06 Z -.99109957 05 DX .66304030 00 DY -.10021742 01 DZ -.35280554 00  
 R .27502936 06 DEC -.21122389 02 RA .29211967 03 V .12523766 01 PTH .78233921 02 AZ .68056943 02  
 R .27502935 06 LAT -.21122390 02 LON .28809871 03 VE .18511999 02 PTE .37975177 01 AZE .27029601 03  
 XS .12370806 09 YS .78662246 08 ZS .34109742 08 DXS -.16470473 02 DYS .22561968 02 DZS .97822952 01  
 XM .53809295 05 YM -.35469259 06 ZM -.13222557 06 DXM .10063992 01 DYM .20004194 00 DZM .49177853-02  
 XT .53809295 05 YT -.35469259 06 ZT -.13222557 06 DXT .10063992 01 DYT .20004194 00 DZT .49177853-02  
 RS .15051547 09 VS .29597502 02 RM .38234260 06 VM .10260995 01 RT .38234260 06 VT .10260995 01  
 GED -.21253357 02 ALT .26865395 06 LOS .28430101 02 RAS .32451055 02 RAM .27862639 03 LOM .27460343 03  
 DUT .34000000 02 DT .19200000 04 DR .12260621 01 SHA .26667478 06 DES .13098129 02 DEM -.20232474 02

## JETGOLD-3

R .27502935 06 1 UNIFORM TIME TAU .00000000 00  
 MIN .22200000 04 HA .31426302 03 DEC -.22117328 02 ELE .18199254 02  
 CKM .34739774 03 CKC .28295845 03 CKT .34739774 03 PSS .10354569 03 PSM .13570270 03  
 UT .37000000 02 DHA .41883972-02 DDE .32483429-05 DEL .23952408-02 DAZ .32134065-02  
 ET .36999055 02 RGE .27297260 06 DRG .97513511 00 DDR .12841018-04 SLS .20081645 03  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .10364666 03 PDL .24077025 03  
 DT .91053847 00 RFI .00000000 00 RF2 .00000000 00 BF1 .14687081 06  
 ESS1 -.12941645 03 ESS2 -.15301645 03 F1 .10624551 06 PRA .29295332 03  
 RF .00000000 00 DOP -.82239400-07

## JOBJET

R .27502935 06 1 UNIFORM TIME TAU .00000000 00  
 MIN .22200000 04 HA .10084588 03 DEC -.23507876 02 ELE .28809871 03  
 CKM .34934546 03 CKC .28490618 03 CKT .34934546 03 PSS .10523026 03 PSM .12296048 02  
 UT .37000000 02 DHA .41021018-02 DDE .46764288-04 DEL -.34210854-02 DAZ -.17494108-02  
 ET .36999055 02 RGE .27499780 06 DRG .15071177 01 DDR -.98565307-05 SLS .20088065 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10533122 03 PUL .36348297 02  
 DT .91729381 00 RFI .00000000 00 RF2 .00000000 00 BF1 .14484675 06  
 ESS1 -.12948065 03 ESS2 -.15308065 03 F1 .10656863 06 F2 .11029321 06 PRA .29085985 03  
 RF .00000000 00 DOP .63125457-07

27

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK JULIAN DATE 2437779.96133102 APRIL 25, 1962 11 04 19.000

1 DAYS 14 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.98976556	05	Y	-.24124879	06	Z	-.10036830	06	DX	.65603237	00	DY	-.98691368	00	DZ	-.34632057	00
R	.27941212	06	DEC	-.21051835	02	RA	.29230675	03	V	.12346315	01	PTH	.78283361	02	AZ	.67925622	02
R	.27941212	06	LAT	-.21051835	02	LON	.27324473	03	VE	.18821896	02	PTF	.36825699	01	AZE	.27028742	03
XS	.12364873	09	YS	.78743457	08	ZS	.34144952	08	DXS	-.16487820	02	DYS	.22551052	02	DZS	.97775547	01
XM	.57429661	05	YM	-.35395583	06	ZM	-.13220167	06	DXM	.10048866	01	DYM	.20926817	00	DZM	.83582740	02
XT	.57429661	05	YT	-.35395583	06	ZT	-.13220167	06	DXT	.10048866	01	DYT	.20926817	00	DZT	.83582740	02
RS	.15051717	09	VS	.29597276	02	RM	.38217819	06	VM	.10264795	01	RT	.38217819	06	VT	.10264795	01
GED	-.21182615	02	ALT	.27303670	06	LOS	.13428251	02	RAS	.32490283	02	RAM	.27921598	03	LOM	.26015396	03
DUT	.34000000	02	DT	.19200000	04	DR	.12089066	01	SHA	.27109388	06	DES	.13111741	02	DEM	-.20237740	02

## JETGOLD-3

R	.27941212	06	HA	.32936710	03	DEC	-.22095293	02	ELE	.27324473	03	AZI	.14836286	03
MIN	.22800000	04	CKC	.28298648	03	CKT	.34733973	03	PSS	.10364094	03	PSM	.12530926	02
CKM	.34733973	03	DHA	.42018956	02	DDE	.91653981	05	DEL	.18110030	02	DAZ	.38291643	02
UT	.38000000	02	RGE	.27657653	06	DRG	.13296855	01	DDR	.17236615	04	SLS	.20093038	03
ET	.37999055	02	PHI	.35116540	02	THI	.24319539	03	SPS	.10374320	03	PDL	.25123844	03
RDI	.63720164	04	RF1	.00000000	00	RF2	.00000000	00	BF1	.14669610	06	PRA	.29289031	03
DT	.92255989	00	ESS2	-.15313037	03	F1	.13476708	06	F2	.10659489	06			
ESS1	-.12953038	03	DOP	-.11039069	06									
RF	.00000000	00												

1 DAYS 15 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.10132584	06	Y	-.24477509	06	Z	-.10160376	06	DX	.64914029	00	DY	-.97223783	00	DZ	-.34008320	00
R	.28373420	06	DEC	-.20983240	02	RA	.29248735	03	V	.12174917	01	PTH	.78333855	02	AZ	.67790006	02
R	.28373419	06	LAT	-.20983241	02	LUN	.25838425	03	VE	.19127660	02	PTE	.35739041	01	AZE	.27027930	03
XS	.12358934	09	YS	.78824623	08	ZS	.34180145	08	DXS	-.16505159	02	DYS	.22540125	02	DZS	.97728100	01
XM	.61044394	05	YM	-.35318586	06	ZM	-.13216538	06	DXM	.10032786	01	DYM	.21848721	00	DZM	.11802693	01
XT	.61044394	05	YT	-.35318586	06	ZT	-.13216538	06	DXT	.10032786	01	DYT	.21848721	00	DZT	.11802693	01
RS	.15051886	09	VS	.29597049	02	RM	.38201355	06	VM	.10268612	01	RT	.38201355	06	VT	.10268612	01
GED	-.21113675	02	ALT	.27735876	06	LOS	.35842642	03	RAS	.32529512	02	RAM	.27980608	03	LOM	.24570299	03
DUT	.34000000	02	DT	.19200000	04	DR	.11923414	01	SHA	.27545037	06	DES	.13125346	02	DEM	-.20241043	02

## JETGOLD-3

R	.28373419	06	HA	.34451007	03	DEC	-.22050408	02	ELE	.25838425	03	AZI	.16321961	03
MIN	.23400000	04	CKC	.28304345	03	CKT	.34731014	03	PSS	.10376823	03	PSM	.12080137	02
CKM	.34731014	03	DHA	.42099041	02	DDE	.15853358	04	DEL	.10095208	02	DAZ	.43960301	02
UT	.39000000	02	RGE	.28040220	06	DRG	.10974140	01	DDR	.20115709	04	SLS	.20104970	03
ET	.38999055	02	PHI	.35116540	02	THI	.24319539	03	SPS	.10387185	03	PDL	.26403787	03
RDI	.63720164	04	RF1	.00000000	00	RF2	.00000000	00	BF1	.14647919	06	PRA	.29278841	03
DT	.93532094	00	ESS2	-.15324970	03	F1	.10497495	06	F2	.10702868	06			
ESS1	-.12964970	03	DOP	-.12882964	06									
RF	.00000000	00												

1 DAYS 16 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.04466435

APRIL 25, 1962 13 04 19.000

28

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK

GEOCENTRIC

EQUATORIAL COORDINATES

X	.10365051	06	Y	-.24824957	06	Z	-.10281718	06	DX	.64235356	00	DY	-.95812584	00	DZ	-.33408216	00
R	.28799766	06	DEC	-.20916499	02	RA	.29266178	03	V	.12009305	01	PTH	.78386018	02	AZ	.67649036	02
R	.28799766	06	LAT	-.20916499	02	LON	.24351761	03	VE	.19429439	02	PTE	.34710585	01	AZE	.27027161	03
XS	.12352988	09	YS	.78905754	08	ZS	.34215321	08	DXS	-.16522491	02	DYS	.22529187	02	DZS	.97680601	01
XM	.64653181	05	YM	-.35238272	06	ZM	-.13211658	06	DXM	.10015750	01	DYM	.22769826	00	DZM	.15250764	-01
XT	.64653181	05	YT	-.35238272	06	ZT	-.13211658	06	DXT	.10015750	01	DYT	.22769826	00	DZT	.15250764	-01
RS	.15052056	09	VS	.29596823	02	RM	.38184870	06	VM	.10272446	01	RT	.38184870	06	VT	.10272446	01
GED	-.21046596	02	ALT	.28162220	06	LDS	.34342458	03	RAS	.32568746	02	RAM	.28039667	03	LOM	.23125252	03
DUT	.34000000	02	DT	.19200000	04	DR	.11763428	01	SHA	.27974632	06	DES	.13138944	02	DEM	-.20242375	02

JETGOLD-3

1 UNIFORM TIME

R	.28799766	06	LAT	-.20916499	02	TAU	.00000000	00	LONG	.24351761	03	AZI	.17963691	03
MIN	.24000000	04	HA	.35967140	03	DEC	-.21980896	02	ELE	.32901713	02	PSM	.11615656	02
CKM	.34730745	03	CKC	.28312818	03	CKT	.34730745	03	PSS	.10390854	03	DAZ	.46497532	-02
UT	.40000000	02	DHA	.42120846	-02	DDE	.22751944	-04	DEL	.44575693	-04	SLS	.20117531	03
ET	.39999055	02	RGE	.28448668	06	DRG	.11724338	01	DDR	.21262288	-04	POL	.27845421	03
RDI	.63720164	04	PHI	.35116540	02	THI	.24319539	03	SPS	.10401361	03	PRA	.29266815	03
DT	.94894530	00	RFI	.00000000	00	RF2	.00000000	00	BFI	.14623892	06			
ESS1	-.12977531	03	ESS2	-.15337531	03	F1	.10521054	06	F2	.10750916	06			
RF	.00000000	00	DOP	-.13617283	-06									

OONJET

1 UNIFORM TIME

R	.28799766	06	LAT	-.20916499	02	TAU	.00000000	00	LONG	.24351761	03	AZI	.11637910	03
MIN	.24000000	04	HA	.25226172	03	DEC	-.20189331	02	ELE	-.37687378	01	PSM	.11756226	02
CKM	.34895739	03	CKC	.28477812	03	CKT	.34895739	03	PSS	.10260849	03	DAZ	-.22239564	-02
UT	.40000000	02	DHA	.41097302	-02	DDE	-.10377389	-04	DEL	.31549356	-02	SLS	.20129236	03
ET	.39999055	02	RGE	.28834631	06	DRG	.82598225	00	DDR	-.12489954	-04	POL	.15427428	03
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10271555	03	PRA	.29376746	03
DT	.96181963	00	RFI	.00000000	00	RF2	.00000000	00	BFI	.14734851	06			
ESS1	-.12989236	03	ESS2	-.15349236	03	F1	.10412961	06	F2	.10529022	06			
RF	.00000000	00	DOP	.79991034	-07									

1 DAYS 17 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.08633102

APRIL 25, 1962 14 04 19.000

GEOCENTRIC

EQUATORIAL COORDINATES

X	.10595092	06	Y	-.25167425	06	Z	-.10400942	06	DX	.63566133	00	DY	-.94456084	00	DZ	-.32830774	00
R	.29220452	06	DEC	-.20851514	02	RA	.29283033	03	V	.11849247	01	PTH	.78440518	02	AZ	.67501482	02
R	.29220452	06	LAT	-.20851514	02	LON	.22864510	03	VE	.19727378	02	PTE	.33736157	01	AZE	.27026435	03
XS	.12347037	09	YS	.78986843	08	ZS	.34250478	08	DXS	-.16539816	02	DYS	.22518237	02	DZS	.97633059	01
XM	.68255651	05	YM	-.35154644	06	ZM	-.13205557	06	DXM	.99977574	00	DYM	.23690038	00	DZM	.18702145	-01
XT	.68255651	05	YT	-.35154644	06	ZT	-.13205557	06	DXT	.99977574	00	DYT	.23690038	00	DZT	.18702145	-01
RS	.15052225	09	VS	.29596598	02	RM	.38168364	06	VM	.10276298	01	RT	.38168364	06	VT	.10276298	01
GED	-.20981281	02	ALT	.28582905	06	LDS	.32842276	03	RAS	.32607983	02	RAM	.28098774	03	LOM	.21680252	03
DUT	.34000000	02	DT	.19200000	04	DR	.11608911	01	SHA	.28398372	06	DES	.13152537	02	DEM	-.20241735	02

29

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
JETGOLD-3

	UNIFORM TIME	STATION PRINTS	BK	LONG	
R	.29220452 06	TAU .00000000 00			
MIN	.24600000 04	LAT -.20851514 02		.22864510 03	
CKM	.34732797 03	HA .14830212 02	DEC -.21887022 02	ELE .31285493 02	AZI .19613600 03
UT	.41000000 02	CKC .28323741 03	CKT .34732797 03	PSS .10404279 03	PSM .11143632 02
ET	.40990055 02	DHA .42085563-02	DDE .29294983-04	DOR .92834000-03	DAZ .44388212-02
RDI	.63720164 04	RGE .28884476 06	DRG .12483242 01	DDR .20598543-04	SLS .20130736 03
DT	.96348229 00	PHI .35116540 02	THI .24319539 03	SPS .10414940 03	POL .29293939 03
ESS1	.12990736 03	RF1 .00000000 00	RF2 .00000000 00	BF1 .14599587 06	
RF	.00000000 00	ESS2 -.15350736 03	F1 .13544613 06	F2 .10799522 06	PRA .29255041 03

DOOMJET

	UNIFORM TIME	TAU .00000000 00	LONG	
R	.29220452 06	LAT -.20851514 02		
MIN	.24600000 04	HA .26709772 03	DEC -.20228927 02	ELE .79632466 01
CKM	.34879252 03	CKC .28470196 03	CKT .34879252 03	PSS .10246633 03
UT	.41000000 02	DHA .41325418-02	DDE -.11325651-04	DEL .33501672-02
ET	.40990055 02	RGE .29125352 06	DRG .79325919 00	DDR -.56182545-05
RDI	.63725296 04	PHI -.31210140 02	THI .13688502 03	SPS .10257453 03
DT	.97151703 00	RF1 .00000000 00	RF2 .00000000 00	BF1 .14745331 06
ESS1	.12997949 03	ESS2 -.15357949 03	F1 .13404646 06	F2 .10508063 06
RF	.00000000 00	DOP .35981715-07		

1 DAYS 18 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.12799768

APRIL 25, 1962 15 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

	UNIFORM TIME	TAU .00000000 00	LONG	
R	.29635670 06	LAT -.20788196 02		
MIN	.25200000 04	HA .29966814 02	DEC -.21771019 02	ELE .26406152 02
CKM	.34736616 03	CKC .28336604 03	CKT .34736616 03	PSS .10415327 03
UT	.42000000 02	DHA .41998779-02	DDE .34968193-04	DEL -.17481166-02
ET	.41999055 02	RGE .29346791 06	DRG .13186454 01	DDR .18191443-04
RDI	.63720164 04	PHI .35116540 02	THI .24319539 03	SPS .10426153 03
DT	.97890344 00	RF1 .00000000 00	RF2 .00000000 00	BF1 .14577065 06
ESS1	.13004528 03	ESS2 -.15364528 03	F1 .10568172 06	F2 .10844561 06
RF	.00000000 00	DOP -.11650582-06		

## JETGOLD-3

	UNIFORM TIME	TAU .00000000 00	LONG	
R	.29635670 06	LAT -.20788196 02		
MIN	.25200000 04	HA .29966814 02	DEC -.21771019 02	ELE .26406152 02
CKM	.34736616 03	CKC .28336604 03	CKT .34736616 03	PSS .10415327 03
UT	.42000000 02	DHA .41998779-02	DDE .34968193-04	DEL -.17481166-02
ET	.41999055 02	RGE .29346791 06	DRG .13186454 01	DDR .18191443-04
RDI	.63720164 04	PHI .35116540 02	THI .24319539 03	SPS .10426153 03
DT	.97890344 00	RF1 .00000000 00	RF2 .00000000 00	BF1 .14577065 06
ESS1	.13004528 03	ESS2 -.15364528 03	F1 .10568172 06	F2 .10844561 06
RF	.00000000 00	DOP -.11650582-06		

30

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 DONJET I  
 R .29635670 06  
 MIN .25200000 04 HA  
 CKM .34863874 03 CKC  
 UT .42000000 02 DHA  
 ET .41999055 02 RGE  
 RDI .63725296 04 PHI  
 DT .98097224 00 RFI  
 ESS1 .13006362 03 ESS2  
 RF .00000000 00 DOP

STATION PRINTS BK  
 UNIFORM TIME TAU .00000000 00  
 LAT -20788196 02  
 LONG .21376697 03  
 .20275389 02 AZI  
 .10240007 03 PSM  
 .34808827-04 DAZ  
 .14513223-05 SLS  
 .10250935 03 POL  
 .14747730 06  
 .10503267 06 PRA  
 .29409574 03

APRIL 25, 1962 16 04 19.000

JULIAN DATE 2437780.16966435

1 DAYS 19 HRS. 0 MIN. 0.000 SEC.

GEOCENTRIC

EQUATORIAL COORDINATES

X .11048021 06 Y -.25838188 06 Z -.10633348 06 DX .62251520 00 DY -.91902462 00 DZ -.31740752 00  
 R .30045612 06 DEC -.20726462 02 RA .29315082 03 V .11545038 01 PTH .78559719 02 AZ .67180625 02  
 R .30045611 06 LAT -.20726462 02 LON .19888346 03 VE .20312299 02 PTE .31935104 01 AZE .27025089 03  
 XS .12335115 09 YS .79148906 08 ZS .34320744 08 DXS -.16574441 02 DYS .22496305 02 DZS .97537828 01  
 XM .75440312 05 YM -.34977458 06 ZM -.13189603 06 DXM .99589001 00 DYM .25527437 00 DZM .25613624-01  
 XT .75440312 05 YT -.34977458 06 ZT -.13189603 06 DXT .99589001 00 DYT .25527437 00 DZT .25613624-01  
 RS .15052564 09 VS .29596150 02 RM .38135293 06 VM .10284055 01 RT .38135293 06 VT .10284055 01  
 GED -.20855594 02 ALT .29408062 06 LOS .29841910 03 RAS .32686469 02 RAM .28217126 03 LOM .18790390 03  
 DUT .34000000 02 DT .19200000 04 DR .11315661 01 SHA .29229052 06 DES .13179703 02 DEM -.20234511 02

JETGOLD-3

R .30045611 06  
 MIN .25800000 04 HA  
 CKM .34741503 03 CKC  
 UT .43000000 02 DHA  
 ET .42999055 02 RGE  
 RDI .63720164 04 PHI  
 DT .99510545 00 RFI  
 ESS1 .13018787 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT -20726462 02  
 LONG .19888346 03  
 .18961965 02 AZI  
 .10422495 03 PSM  
 -.23518354-02 DAZ  
 .14243933-04 SLS  
 .10433497 03 POL  
 .14558231 06  
 .10882223 06 PRA  
 .29239850 03

DONJET

R .30045611 06  
 MIN .25800000 04 HA  
 CKM .34850135 03 CKC  
 UT .43000000 02 DHA  
 ET .42999055 02 RGE  
 RDI .63725296 04 PHI  
 DT .99048921 00 RFI  
 ESS1 .13014748 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT -20726462 02  
 LONG .19888346 03  
 .32963270 02 AZI  
 .10240500 03 PSM  
 -.35599649-02 DAZ  
 .82418739-05 SLS  
 .10251533 03 POL  
 .14742091 06  
 .10514542 06 PRA  
 .29414091 03

31

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK

1 DAYS 20 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.21133102

APRIL 25, 1962

17 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.11270960	06	Y	-.26166864	06	Z	-.10746684	06	DX	.61603691	00	DY	-.90704071	00	DZ	-.31227000	00
R	.30450460	06	DEC	-.20666235	02	RA	.29330319	03	V	.11400600	01	PTH	.78626288	02	AZ	.67003585	02
R	.30450459	06	LAT	-.20666235	02	LON	.18399476	03	VE	.20599562	02	PTE	.31102256	01	AZE	.27024466	03
XS	.12329145	09	YS	.792229875	08	ZS	.34355851	08	DXS	-.16591741	02	DYS	.22485323	02	DZS	.97490145	01
XM	.79021800	05	YM	-.34883908	06	ZM	-.13179760	06	DXM	.99380340	00	DYM	.26444444	00	DZM	.29073074	-01
XT	.79021800	05	YT	-.34883908	06	ZT	-.13179760	06	DXT	.99380340	00	DYT	.26444444	00	DZT	.29073074	-01
RS	.15052733	09	VS	.29595927	02	RM	.38118729	06	VM	.10287960	01	RT	.38118729	06	VT	.10287960	01
GED	-.20795060	02	ALT	.29812908	06	LOS	.28341729	03	RAS	.32725716	02	RAM	.28276368	03	LOM	.17345526	03
DUT	.34000000	02	DT	.19200000	04	DR	.11176713	01	SHA	.29636358	06	DES	.13193275	02	DEM	-.20227919	02

## JETGOLD-3

R	.30450459	06	I	UNIFORM TIME	LAT	TAU	.00000000	00	LONG	.18399476	03
MIN	.26400000	04	HA	.60109411	02	DEC	-.21489525	02	ELE	.97048295	01
CKM	.34746668	03	CKC	.28365492	03	CKT	.34746668	03	PSS	.10424647	03
UT	.44000000	02	DHA	.41710505	-02	DDE	.42182795	-04	DEL	-.27630386	-02
ET	.43999055	02	RGE	.30336566	06	DRG	.14197278	01	DDR	.90708459	-05
RDI	.63720164	04	PHI	.35116540	02	THI	.24319539	03	SPS	.10435833	03
DT	.10119188	01	RF1	.00000000	00	RF2	.00000000	00	BF1	.14544691	06
ESS1	-.13033340	03	ESS2	-.15393340	03	F1	.10598659	06	F2	.10909302	06
RF	.00000000	00	DOP	-.58093594	-07						

## OOMJET

R	.30450459	06	I	UNIFORM TIME	LAT	TAU	.00000000	00	LONG	.18399476	03
MIN	.26400000	04	HA	.31207668	03	DEC	-.20324162	02	ELE	.45843231	02
CKM	.34838429	03	CKC	.28457254	03	CKT	.34838429	03	PSS	.10247198	03
UT	.44000000	02	DHA	.41932891	-02	DDE	-.38819342	-05	DEL	.35849873	-02
ET	.43999055	02	RGE	.29990035	06	DRG	.84419730	00	DDR	.14272320	-04
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10258339	03
DT	.10003597	01	RF1	.00000000	00	RF2	.00000000	00	BF1	.14729017	06
ESS1	-.13023361	03	ESS2	-.15383361	03	F1	.10419890	06	F2	.10540688	06
RF	.00000000	00	DOP	-.91406068	-07						

1 DAYS 21 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.25299768

APRIL 25, 1962

18 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.11491575	06	Y	-.26491319	06	Z	-.10858206	06	DX	.60960376	00	DY	-.89557925	00	DZ	-.30733579	00
R	.30850396	06	DEC	-.20607444	02	RA	.29345055	03	V	.11261146	01	PTH	.78699012	02	AZ	.66812305	02
R	.30850395	06	LAT	-.20607444	02	LON	.16910105	03	VE	.20883547	02	PTE	.30311004	01	AZE	.27023872	03
XS	.12323168	09	YS	.79310808	08	ZS	.34390940	08	DXS	-.16609034	02	DYS	.22474330	02	DZS	.97442413	01
XM	.82595604	05	YM	-.34787059	06	ZM	-.13168670	06	DXM	.99162086	00	DYM	.27360203	00	DZM	.32534572	-01
XT	.82595604	05	YT	-.34787059	06	ZT	-.13168670	06	DXT	.99162086	00	DYT	.27360203	00	DZT	.32534572	-01
RS	.15052903	09	VS	.29595704	02	RM	.38102148	06	VM	.10291883	01	RT	.38102148	06	VT	.10291883	01
GED	-.20735969	02	ALT	.30212842	06	LOS	.26841547	03	RAS	.32764967	02	RAM	.28335653	03	LOM	.15900704	03
DUT	.34000000	02	DT	.19200000	04	DR	.11042807	01	SHA	.30038545	06	DES	.13206843	02	DEM	-.20219335	02

32

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
JETGOLD-3 1  
R 30850395 06  
MIN 27000000 04 HA  
CKM 34751294 03 CKC  
UT 45000000 02 DHA  
ET 44999055 02 RGE  
RDI 63720164 04 PHI  
DT 10291212 01 RFI  
ESS1 13047982 03 ESS2  
RF 00000000 00 DDP

STATION PRINTS BK  
UNIFORM TIME TAU 00000000 00  
LAT -20607444 02  
LONG 16910105 03  
ELE -76145424 00  
PSS 10421075 03  
DEL -30318588-02  
DDR 30664489-05  
SPS 10432453 03  
BFI 14537635 06  
F2 10923413 06  
PRA 29245111 03  
AZI 24418466 03  
PSM 92806254 01  
DAZ 24037983-02  
SLS 20187981 03  
POL 33109761 03

DOMJET 1  
R 30850395 06  
MIN 27000000 04 HA  
CKM 34828967 03 CKC  
UT 45000000 02 DHA  
ET 44999055 02 KGE  
RDI 63725296 04 PHI  
DT 10108429 01 RFI  
ESS1 13032416 03 ESS2  
RF 00000000 00 DDP

UNIFORM TIME TAU 00000000 00  
LAT -20607444 02  
LONG 16910105 03  
ELE -58664919 02  
PSS 10258803 03  
DEL -35138999-02  
DDR 19098907-04  
SPS 10270055 03  
BFI 14709644 06  
F2 10579430 06  
PRA 29403640 03  
AZI 77642398 02  
PSM 97152989 01  
DAZ -34469132-02  
SLS 20172416 03  
POL 16260024 03

1 DAYS 22 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.29466435

APRIL 25, 1962 19 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X 11709881 06 Y -26811743 06 Z -10967989 06 DX 60320026 00 DY -88464703 00 DZ -30260331 00  
R 31245602 06 DEC -20550024 02 RA 29359303 03 VE 21164397 02 PTH 78779274 02 AZ 66603716 02  
R 31245602 06 LAT -20550024 02 LON 15420247 03 DKS -16626319 02 DYS 22463324 02 DZS 97394630 01  
XS 12317186 09 YS 79391703 08 ZS 34426013 08 DXM 98934238 00 DYM 28274627 00 DZM 35997811-01  
XM 86161387 05 YM -34686915 06 ZM -13156334 06 DXT 98934238 00 DYT 28274627 00 DZT 35997811-01  
XT 86161387 05 YT -34686915 06 ZT -13156334 06 VM 10295822 01 RT 38085548 06 VT 10295822 01  
RS 15053072 09 VS 29595482 02 RM 38085548 06 RAS 32804224 02 RAM 28394978 03 LOM 14455923 03  
GED -20678255 02 ALT 30608047 06 LOS 25341366 03 SHA 30435786 06 DES 13220405 02 DEM -20208756 02  
DUT 34000000 02 DT 19200000 04 DR 10913946 01

DOMJET 1  
R 31245602 06  
MIN 27600000 04 HA  
CKM 34821755 03 CKC  
UT 46000000 02 DHA  
ET 45999055 02 RGE  
RDI 63725296 04 PHI  
DT 10221460 01 RFI  
ESS1 13042074 03 ESS2  
RF 00000000 00 DDP

UNIFORM TIME TAU 00000000 00  
LAT -20550024 02  
LONG 15420247 03  
ELE 70778007 02  
PSS 10273713 03  
DEL 31074554-02  
DDR 22357968-04  
SPS 10285084 03  
BFI 14685580 06  
F2 10627554 06  
PRA 293991649 03  
AZI 59682386 02  
PSM 92477499 01  
DAZ -74214898-02  
SLS 20182074 03  
POL 15148602 03



33

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK

1 DAYS 23 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.33633102

APRIL 25, 1962 20 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.11925883	06	Y	-.27128329	06	Z	-.11076105	06	DX	.59680860	00	DY	-.87425785	00	DZ	-.29807311	00
R	.31636261	06	DEC	-.20493913	02	RA	.29373077	03	V	.10997067	01	PTH	.78868758	02	AZ	.66373960	02
R	.31636260	06	LAT	-.20493914	02	LON	.13929913	03	VE	.21442265	02	PTE	.28844571	01	AZE	.27022764	03
XS	.12311197	09	YS	.79472552	08	ZS	.34461068	08	DXS	-.16643596	02	DYS	.22452309	02	DZS	.97346804	01
XM	.89718783	05	YM	-.34583483	06	ZM	-.13142752	06	DXM	.98696793	00	DYM	.29187620	00	DZM	.39462435	01
XT	.89718783	05	YT	-.34583483	06	ZT	-.13142752	06	DXT	.98696793	00	DYT	.29187620	00	DZT	.39462435	01
RS	.15053241	09	VS	.29595261	02	RM	.38068934	06	VM	.10299780	01	RT	.38068934	06	VT	.10299780	01
GED	-.20621857	02	ALT	.30998705	06	LDS	.23841185	03	RAS	.32843481	02	RAM	.28454344	03	LOM	.13011181	03
DUT	.34000000	02	UT	.19200000	04	DR	.10790185	01	SHA	.30828256	06	DES	.13233960	02	DEM	-.20196177	02

## DOMJET

R	.31636260	06	I	UNIFORM TIME	LAT	TAU	.00000000	00	LONG	.13929913	03
MIN	.28200000	04	HA	.35754066	03	DEC	-.20274665	02	ELE	.78843533	02
CKM	.34816579	03	CKC	.28466709	03	CKT	.34816579	03	PSS	.10290144	03
UT	.47000000	02	DHA	.42181331	02	DDE	.13875267	04	DEL	.73688142	03
ET	.46999055	02	RGE	.31010810	06	DRG	.10634821	01	DDR	.23803749	04
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10301644	03
DT	.10344091	01	RF1	.00000000	00	RF2	.00000000	00	RF1	.14658786	06
ESS1	-.13052433	03	ESS2	-.15412433	03	F1	.10489181	06	F2	.10681135	06
RF	.00000000	00	DDP	-.15244944	06						

2 DAYS 0 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.37799768

APRIL 25, 1962 21 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.12139584	06	Y	-.27441275	06	Z	-.11182626	06	DX	.59040802	00	DY	-.86443377	00	DZ	-.29374817	00
R	.32022558	06	DEC	-.20439056	02	RA	.29386384	03	V	.10872513	01	PTH	.78969501	02	AZ	.66118119	02
R	.32022557	06	LAT	-.20439057	02	LON	.12439114	03	VF	.21717305	02	PTE	.28165856	01	AZE	.27022246	03
XS	.12305201	09	YS	.79553368	08	ZS	.34496107	08	DXS	-.16660867	02	DYS	.22441281	02	DZS	.97298928	01
XM	.93267471	05	YM	-.34476766	06	ZM	-.13127921	06	DXM	.98449744	00	DYM	.30099098	00	DZM	.42928152	01
XT	.93267471	05	YT	-.34476766	06	ZT	-.13127921	06	DXT	.98449744	00	DYT	.30099098	00	DZT	.42928152	01
RS	.15053411	09	VS	.29595040	02	RM	.38052304	06	VM	.10303755	01	RT	.38052304	06	VT	.10303755	01
GED	-.20566719	02	ALT	.31385000	06	LDS	.22341005	03	RAS	.32882745	02	RAM	.28513748	03	LOM	.11566478	03
DUT	.34000000	02	DT	.19200000	04	DR	.10671648	01	SHA	.31216128	06	DES	.13247509	02	DEM	-.20181596	02

## DOMJET

R	.32022557	06	I	UNIFORM TIME	LAT	TAU	.00000000	00	LONG	.12439114	03
MIN	.28800000	04	HA	.12723082	02	DEC	-.20213437	02	ELE	.74139734	02
CKM	.34813002	03	CKC	.28474827	03	CKT	.34813002	03	PSS	.10306271	03
UT	.48000000	02	DHA	.42156590	02	DDE	.20064970	04	DEL	-.27411964	02
ET	.47999055	02	RGE	.31409090	06	DRG	.11489070	01	DDR	.23335064	04
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10317911	03
DT	.10476943	01	RF1	.00000000	00	RF2	.00000000	00	RF1	.14631427	06
ESS1	-.13063517	03	ESS2	-.15423517	03	F1	.10514125	06	F2	.10735848	06
RF	.00000000	00	DUP	-.14944777	06						

AZ1	.31086593	03
PSM	.82838447	01
DAZ	-.10437284	01
SLS	.20203517	03
POL	.55970361	02
PRA	.29363463	03

34

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 JOBJET I  
 R .32022557 06  
 MIN .28800000 04 HA  
 CKM .34820265 03 CKC  
 UT .48000000 02 DHA  
 ET .47999055 02 RGE  
 RDI .63754947 04 PHI  
 DT .10672404 01 RFI  
 ESS1 .13079573 03 ESS2  
 RF .00000000 00 DOP

STATION PRINTS BK  
 UNIFORM TIME TAU .00000000 00  
 LAT -20439057 02  
 LONG  
 DEC  
 CKT  
 DDE  
 DRG  
 THI  
 RFI  
 F1  
 F2

12439114 03  
 19010602 01  
 10179383 03  
 34764403-02  
 -70800625-05  
 10191299 03  
 14781282 06  
 10436170 06  
 29495039 03

11125991 03  
 83627792 01  
 -17400206-02  
 20219573 03  
 16323078 03  
 29495039 03

APRIL 25, 1962 22 04 19.000

JULIAN DATE 2437780.41966435

2 DAYS 1 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .12350974 06 Y -.27750791 06 Z -.11287628 06 DX .58397340 00 DY -.85520762 00 DZ -.28963452 00  
 R .32404684 06 DEC -.20385401 02 RA .29399229 03 V .10753107 01 PTH .79084021 02 AZ .65829796 02  
 R .32404683 06 LAT -.20385401 02 LON .10947853 03 VE .21989689 02 PTE .27521640 01 AZE .27021749 03  
 XS .12299200 09 YS .79634139 08 ZS .34531128 08 DXS -.16678128 02 DYS .22430243 02 DZS .97251007 01  
 XM .96807082 05 YM -.34366770 06 ZM -.13111843 06 DXM .98193093 00 DYM .31008964 00 DZM .46394606-01  
 XT .96807082 05 YT -.34366770 06 ZT -.13111843 06 DXT .98193093 00 DYT .31008964 00 DZT .46394606-01  
 RS .15053580 09 VS .29594819 02 RM .38035659 06 VM .10307746 01 RT .38035659 06 VT .10307746 01  
 GED -.20512787 02 ALT .31767124 06 LOS .20840824 03 RAS .32922010 02 RAM .28573189 03 LOM .10121813 03  
 DUT .34000000 02 DT .19200000 04 DR .10558540 01 SHA .31599578 06 DES .13261051 02 DEM -.20165009 02

ODMJET I  
 R .32404683 06  
 MIN .29400000 04 HA  
 CKM .34810389 03 CKC  
 UT .49000000 02 DHA  
 ET .48999055 02 RGE  
 RDI .63752296 04 PHI  
 DT .10619815 01 RFI  
 ESS1 .13075282 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT -20385401 02  
 LONG  
 DEC  
 CKT  
 DDE  
 DRG  
 THI  
 RFI  
 F1  
 F2

10947853 03  
 62636304 02  
 10320364 03  
 -34513744-02  
 21005158-04  
 10332155 03  
 14605694 06  
 10787309 06  
 29351142 03

28716682 03  
 77961652 01  
 -41847099-02  
 20215282 03  
 39002230 02  
 29351142 03

JOBJET I  
 R .32404683 06  
 MIN .29400000 04 HA  
 CKM .34801114 03 CKC  
 UT .49000000 02 DHA  
 ET .48999055 02 RGE  
 RDI .63754947 04 PHI  
 DT .10753188 01 RFI  
 ESS1 .13086123 03 ESS2  
 RF .00000000 00 DOP

UNIFORM TIME TAU .00000000 00  
 LAT -20385401 02  
 LONG  
 DEC  
 CKT  
 DDE  
 DRG  
 THI  
 RFI  
 F1  
 F2

10947853 03  
 14679380 02  
 10173406 03  
 36139893-02  
 41469320-06  
 10185414 03  
 14785137 06  
 10428459 06  
 29506728 03

10540782 03  
 79425569 01  
 -15330988-02  
 20226123 03  
 16752780 03  
 29506728 03

35

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362

STATION PRINTS BK

2 DAYS 2 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.46133102

APRIL 25, 1962 23 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.12560039 06	Y	-.28057102 06	Z	-.11391189 06	DX	.57747393 00	DY	-.84662576 00	DZ	-.28574186 00
R	.32782841 06	DEC	-.20332897 02	RA	.29411615 03	V	.10639078 01	PTH	.79215466 02	AZ	.65500516 02
R	.32782841 06	LAT	-.20332897 02	LON	.94561316 02	VE	.22259606 02	PTE	.26910979 01	AZE	.27021272 03
XS	.12293193 09	YS	.79714871 08	ZS	.34566130 08	DXS	-.16695382 02	DYS	.22419194 02	DZS	.97203039 01
XM	.10033728 06	YM	-.34253502 06	ZM	-.13094517 06	DXM	.97926839 00	UYM	.31917128 00	UZM	.49861477-01
XT	.10033728 06	YT	-.34253502 06	ZT	-.13094517 06	DXT	.97926839 00	UYT	.31917128 00	DZT	.49861477-01
RS	.15053749 09	VS	.29594599 02	RM	.38019001 06	VM	.10311756 01	RT	.38019001 06	VT	.10311756 01
GED	-.20460013 02	ALT	.32145282 06	LDS	.19340645 03	RAS	.32961280 02	RAM	.23632666 03	LOM	.86771829 02
DUT	.34000000 02	DT	.19200000 04	DR	.10451158 01	SHA	.31978792 06	DES	.13274587 02	DEM	-.20146413 02

## DOMJET

R	.32782841 06	I	UNIFORM TIME	TAU	.00000000 00	LONG	.94561316 02
MIN	.30000000 04	HA	.43016750 02	DEC	-.20332897 02	ELE	.49906716 02
CKM	.34807923 03	CKC	.28496062 03	CKT	.34807923 03	PSS	.10330923 03
UT	.50000000 02	DHA	.41964397-02	DDE	.30008459-04	DEL	-.35845891-02
ET	.49999055 02	RGE	.32292776 06	DRG	.12981462 01	DDR	.17014630-04
RDI	.63725296 04	PHI	-.31210140 02	THI	.13688502 03	SPS	.10342878 03
DT	.10771709 01	RF1	.00000000 00	RF2	.00000000 00	BF1	.14583630 06
ESS1	-.13087618 03	ESS2	-.15447618 03	F1	.10561243 06	F2	.10831432 06
RF	.00000000 00	DOP	-.10896900-06				

AZI	.27561380 03	PSM	.73095702 01	DAZ	-.25493288-02	SLS	.20227618 03	PDL	.34538222 02	PRA	.29342310 03
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## JOBJET

R	.32782841 06	I	UNIFORM TIME	TAU	.00000000 00	LONG	.94561316 02
MIN	.30000000 04	HA	.29213183 03	DEC	-.20332897 02	ELE	.27869900 02
CKM	.34782476 03	CKC	.28470615 03	CKT	.34782476 03	PSS	.10174441 03
UT	.50000000 02	DHA	.41769681-02	DDE	-.97124630-05	DEL	.37079312-02
ET	.49999055 02	RGE	.32479964 06	DRG	.68384988 00	DUR	.77888167-05
RDI	.63754947 04	PHI	-.25734820 02	THI	.27684780 02	SPS	.10186538 03
DT	.10834148 01	RF1	.00000000 00	RF2	.00000000 00	BF1	.14780372 06
ESS1	-.13092638 03	ESS2	-.15452638 03	F1	.10370001 06	F2	.10437990 06
RF	.00000000 00	DOP	-.49882929-07				

AZI	.10006821 03	PSM	.75042331 01	DAZ	-.14554559-02	SLS	.20232638 03	PDL	.17073625 03	PRA	.29510777 03
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2 DAYS 3 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.50299768

APRIL 26, 1962 00 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X	.12766746 06	Y	-.28360447 06	Z	-.11493390 06	DX	.57087079 00	DY	-.83875298 00	DZ	-.28208493 00
R	.33157243 06	DEC	-.20281503 02	RA	.29423353 03	V	.10530774 01	PTH	.79367844 02	AZ	.65118774 02
R	.33157243 06	LAT	-.20281504 02	LON	.79639436 02	VE	.22527263 02	PTE	.26333375 01	AZE	.27020814 03
XS	.12287179 09	YS	.79795568 08	ZS	.34601118 08	DXS	-.16712628 02	DYS	.22408133 02	DZS	.97155021 01
XM	.10385773 06	YM	-.34136968 06	ZM	-.13075942 06	DXM	.97650967 00	UYM	.32823539 00	UZM	.53328657-01
XT	.10385773 06	YT	-.34136968 06	ZT	-.13075942 06	DXT	.97650967 00	UYT	.32823539 00	DZT	.53328657-01
RS	.15053918 09	VS	.29594638 02	RM	.38002330 06	VM	.10315782 01	RT	.38002330 06	VT	.10315782 01
GED	-.20408354 02	ALT	.32519681 06	LDS	.17840451 03	RAS	.33000555 02	RAM	.28692177 03	LOM	.72325824 02
DUT	.34000000 02	DT	.19200000 04	DR	.10349981 01	SHA	.32353958 06	DES	.13288117 02	DEM	-.20125806 02

36

## SPACE TRAJECTORIES

CASE 1

```

RANGER-4 ORBIT 042362 1
DOMJET
R .33157242 06
MIN .30600000 04 HA .58098008 02 DEC -.19916598 02 ELE .79639436 02
CKM .34804642 03 CKC .28507931 03 CKT .34804642 03 PSS .36975188 02 AZI .26756885 03
UT .51000000 02 DHA .41815937-02 DDE .33073394-04 DEL .35869779-02 DAZ .10336785 03 PSM .68266185 01
ET .50999055 02 RGE .32770045 06 DRG .13501546 01 DDR .11688779-04 SLS .20149693-02
RDI .63725296 04 PHI -.31210140 02 THI .13688502 03 SPS .10348913 03 POL .20240361 03
DT .10930909 01 RFI .00000000 00 RF2 .00000000 00 BFI .14566973 06
ESS1 -.13100361 03 ESS2 -.15460361 03 F1 .10577872 06 F2 .10864742 06 PRA .29338295 03
RF .00000000 00 DOP -.74859961-07

JOURNAL DATE 2437780.54466435
APRIL 26, 1962 01 04 19.000

EQUATORIAL COORDINATES
X .12971050 06 Y -.28661099 06 Z -.11594321 06 DX .56411340 00 DY -.83167882 00 DZ -.27868497 00
R .33528122 06 DEC -.20231176 02 RA .29434991 03 V .10428705 01 PTH .79546364 02 AZ .64668549 02
R .33528122 06 LAT -.20231177 02 LON .64712899 02 VE .22792908 02 PTE .25788787 01 AZE .27020371 03
XS .12281159 09 YS .79876221 08 ZS .34636087 08 DXS -.16729867 02 DYS .22397061 02 DZS .97106958 01
XM .10736807 06 YM -.34017174 06 ZM -.13056120 06 DXM .97365507 00 DYM .33728030 00 DZM .56795376-01
XT .10736807 06 YT -.34017174 06 ZT -.13056120 06 DXT .97365507 00 DYT .33728030 00 DZT .56795376-01
RS .15054087 09 VS .29594162 02 RM .37985647 06 VM .10319825 01 RT .37985647 06 VT .10319825 01
GED -.20357767 02 ALT .32890560 06 LOS .16340282 03 RAS .33039831 02 RAM .28751720 03 LOM .57880197 02
DUT .34000000 02 DT .19200000 04 DR .10255610 01 SHA .32725281 06 DES .13301641 02 DEM -.20103185 02

2 DAYS 4 HRS. 0 MIN. 0.000 SEC.
GEOCENTRIC
DOMJET
R .33528122 06
MIN .31200000 04 HA .73122032 02 DEC -.19794297 02 ELE .64712899 02
CKM .34799463 03 CKC .28519733 03 CKT .34799463 03 PSS .24149646 02 AZI .26066073 03
UT .52000000 02 DHA .41648876-02 DDE .34609677-04 DEL .35302007-02 DAZ .10337191 03 PSM .63487744 01
ET .51999055 02 RGE .33262365 06 DRG .13812004 01 DDR .13812004 01 DDR .54437806-05 SLS .20253313 03
RDI .63725296 04 PHI -.31210140 02 THI .13688502 03 SPS .10348913 03 POL .35787830 02
DT .11095129 01 RFI .00000000 00 RF2 .00000000 00 BFI .14557030 06
ESS1 -.13113313 03 ESS2 -.15473313 03 F1 .10586187 06 F2 .10884626 06 PRA .29340000 03
RF .00000000 00 DOP -.34864310-07

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37

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 JOBJET I STATION PRINTS BK  
 R UNIFORM TIME TAU .00000000 00  
 MIN LAT .33528122 06  
 CKM .31200000 04 HA .32233270 03 DEC -.20054338 02 ELE .64712899 02  
 UT .34747225 03 CKC .28467494 03 CKT .34747225 03 PSS .54956760 02 AZI .88606136 02  
 ET .51999055 02 RGE .33004149 06 DRG .73714146 00 DDR .20161535-04 DAZ -19567377-02  
 RDI .63754947 04 PHI .257334820 02 THI .27684780 02 SPS .10206672 03 PDL .17343999 03  
 DT .11008998 01 RFI .00000000 00 RF2 .00000000 00 BFI .14747290 06 PRA .29498909 03  
 ESS1 -.13106544 03 ESS2 -.15466544 03 F1 .10403260 06 F2 .10504145 06  
 RF .00000000 00 DOP -.12912314-06

2 DAYS 5 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.58633102

APRIL 26, 1962 02 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .13172884 06 Y -.28959365 06 Z -.11694078 06 DX .55713443 00 DY -.82552800 00 DZ -.27557235 00  
 R .33895739 06 DEC -.20181881 02 RA .29445959 03 V .10333612 01 PTH .79757863 02 AZ .64126834 02  
 R .33895739 06 LAT -.20181881 02 LON .49781511 02 VE .23056834 02 PTE .25277813 01 AZE .27019944 03  
 XS .12275133 09 YS .79956836 08 ZS .34671039 08 DXS -.16747097 02 DYS .22385979 02 DZS .97058845 01  
 XM .11086796 06 YM -.33894128 06 ZM -.13035049 06 DXM .97070451 00 DYM .34630545 00 DZM .60261517-01  
 XT .11086796 06 YT -.33894128 06 ZT -.13035049 06 DXT .97070451 00 DYT .34630545 00 DZT .60261517-01  
 RS .15054256 09 VS .29593943 02 RM .37968953 06 VM .10323886 01 RT .37968953 06 VT .10323886 01  
 GD -.20308216 02 ALT .33258175 06 LOS .14840133 03 RAS .33079112 02 RAM .28811296 03 LOM .43434883 02  
 LUT .34000000 02 DT .19200000 04 DR .10168947 01 SHA .33092984 06 DES .13315159 02 DEM -.20078550 02

DOMJET I UNIFORM TIME TAU .00000000 00  
 R LAT .33895739 06  
 MIN .31800000 04 HA .88084556 02 DEC -.20181881 02 LONG .49781511 02  
 CKM .34791192 03 CKC .28530816 03 CKT .34791192 03 PSS .10331827 03 AZI .25390418 03  
 UT .52999999 02 DHA .41476470-02 DDE .34582455-04 DEL -.34251969-02 DAZ -.19162630-02  
 ET .52999055 02 RGE .33761691 06 DRG .13888095 01 DDR -.12506651-05 SLS .20266255 03  
 RDI .63725296 04 PHI .31210140 02 THI .13688502 03 SPS .10344325 03 PDL .38830269 02  
 DT .11261686 01 RFI .00000000 00 RF2 .00000000 00 BFI .14554593 06 PRA .29347854 03  
 ESS1 -.13126255 03 ESS2 -.15486255 03 F1 .10588959 06 F2 .10889499 06  
 RF .00000000 00 DOP .80097964-08

JOBJET I UNIFORM TIME TAU .00000000 00  
 R LAT .33895739 06  
 MIN .31800000 04 HA .33750758 03 DEC -.20181881 02 LONG .49781511 02  
 CKM .34730163 03 CKC .28469788 03 CKT .34730163 03 PSS .10210789 03 AZI .79281702 02  
 UT .52999999 02 DHA .42199060-02 DDE .40086317-05 DEL .37336831-02 DAZ -.36416217-02  
 ET .52999055 02 RGE .33301563 06 DRG .86762200 00 DDR .24267511-04 SLS .20254336 03  
 RDI .63754947 04 PHI .257334820 02 THI .27684780 02 SPS .10223175 03 PDL .17035464 03  
 DT .11108204 01 RFI .00000000 00 RF2 .00000000 00 BFI .14721515 06 PRA .29485527 03  
 ESS1 -.13114336 03 ESS2 -.15474336 03 F1 .10426819 06 F2 .10555691 06  
 RF .00000000 00 DOP -.15541957-06

CASE 1 SPACE TRAJECTORIES 38

RANGER-4 ORBIT 042362 STATION PRINTS BK

2 DAYS 6 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437780.62799768 APRIL 26, 1962 03 04 19.000

GEOCENTRIC

EQUATORIAL COORDINATES

X	.13372152	06	Y	-.29255609	06	Z	-.11792772	06	DX	.54984106	00	DY	-.82047629	00	DZ	-.27279053	00
R	.34260393	06	DEC	-.20133581	02	RA	.29456419	03	V	.10246566	01	PTH	.80011605	02	AZ	.63459338	02
R	.34260393	06	LAT	-.20133581	02	LON	.34845050	02	VE	.23319407	02	PTE	.24801962	01	AZE	.27019530	03
XS	.12269100	09	YS	.80037410	08	ZS	.34705973	08	DXS	-.16764320	02	DYS	.22374885	02	DZS	.97010686	01
XM	.11435706	06	YM	-.33767836	06	ZM	-.13012731	06	DXM	.96765800	00	DYM	.35530993	00	DZM	.63726744	-01
XT	.11435706	06	YT	-.33767836	06	ZT	-.13012731	06	DXT	.96765800	00	DYT	.35530993	00	DZT	.63726744	-01
RS	.15054426	09	VS	.29593726	02	RM	.37952249	06	VM	.10327963	01	RT	.37952249	06	VT	.10327963	01
GED	-.20259666	02	ALT	.33622828	06	LDS	.13339926	03	RAS	.33118397	02	RAM	.28870902	03	LOM	.28989876	02
DUT	.34000000	02	DT	.19200000	04	DR	.10091258	01	SHA	.33457318	06	DES	.13328670	02	DEM	-.20051896	02

OOMJET

R	.34260393	06	I	UNIFORM TIME	TAU	.00000000	00				
MIN	.32400000	04	HA	.10298599	03	DEC	-.19547090	02	ELE	.34845050	02
CKM	.34778490	03	CKC	.28540611	03	CKT	.34778490	03	PSS	-.44353398	00
UT	.54000000	02	DHA	.41311550	-02	DDE	.33068867	-04	DEL	-.32628474	-02
ET	.53999055	02	RGE	.34259399	06	DRI	.13722408	01	DDR	-.79075281	-05
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10333502	03
DT	.11427704	01	RF1	.00000000	00	RF2	.00000000	00	BF1	.14559900	06
ESS1	-.13138966	03	ESS2	-.15498966	03	F1	.10583415	06	F2	.10878887	06
RF	.00000000	00	DOP	.50643207	-07						

JOBJET

R	.34260393	06	I	UNIFORM TIME	TAU	.00000000	00				
MIN	.32400000	04	HA	.10298599	03	DEC	-.19547090	02	ELE	.34845050	02
CKM	.34778490	03	CKC	.28540611	03	CKT	.34778490	03	PSS	-.44353398	00
UT	.54000000	02	DHA	.41311550	-02	DDE	.33068867	-04	DEL	-.32628474	-02
ET	.53999055	02	RGE	.34259399	06	DRI	.13722408	01	DDR	-.79075281	-05
RDI	.63725296	04	PHI	-.31210140	02	THI	.13688502	03	SPS	.10333502	03
DT	.11427704	01	RF1	.00000000	00	RF2	.00000000	00	BF1	.14559900	06
ESS1	-.13138966	03	ESS2	-.15498966	03	F1	.10583415	06	F2	.10878887	06
RF	.00000000	00	DOP	.50643207	-07						

2 DAYS 7 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437780.66966435 APRIL 26, 1962 04 04 19.000

GEOCENTRIC

EQUATORIAL COORDINATES

X	.13568718	06	Y	-.29550270	06	Z	-.11890534	06	DX	.54210079	00	DY	-.81677650	00	DZ	-.27040234	00
R	.34622440	06	DEC	-.20086248	02	RA	.29466336	03	V	.10169142	01	PTH	.80320371	02	AZ	.62612611	02
R	.34622440	06	LAT	-.20086248	02	LON	.19903154	02	VE	.23581099	02	PTE	.24363865	01	AZE	.27019127	03
XS	.12263062	09	YS	.80117943	08	ZS	.34740891	08	DXS	-.16781534	02	DYS	.22363779	02	DZS	.96962480	01
XM	.11783501	06	YM	-.33638306	06	ZM	-.12989166	06	DXM	.96451556	00	DYM	.36429282	00	DZM	.67190717	-01
XT	.11783501	06	YT	-.33638306	06	ZT	-.12989166	06	DXT	.96451556	00	DYT	.36429282	00	DZT	.67190717	-01
RS	.15054595	09	VS	.29593508	02	RM	.37935537	06	VM	.10332057	01	RT	.37935537	06	VT	.10332057	01
GED	-.20212087	02	ALT	.33984874	06	LDS	.11839747	03	RAS	.33157684	02	RAM	.28930536	03	LOM	.14545151	02
DUT	.34000000	02	DT	.19200000	04	DR	.10024368	01	SHA	.33818575	06	DES	.13342174	02	DEM	-.20023223	02

39

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 JOBJET 1  
 R .34622439 06  
 MIN .33000000 04 HA .79210846 01 DEC -.19977364 02 ELE .19903154 02  
 CKM .34693065 03 CKC .28481938 03 CKT .34693065 03 PSS .10248353 03 AZI .80707828 02  
 UT .55000000 02 DHA .42248150-02 DDE .16237922-04 DEL -.30630497-02 PSM .51059981 01  
 ET .54999055 02 RGE .33993103 06 DRG .10564755 01 DDR .26888371-04 SLS .15647423-01  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .20272188 03  
 DT .11338877 01 RFI .00000000 00 RF2 .14661030 06 POL .496663706 02  
 ESSI -.13132188 03 ESS2 -.15492188 03 F1 .10676647 06 PRA .29452390 03  
 RF .00000000 00 DDP -.17220468-06 F2 .10486409 06 DES .13355673 02 DEM -.19992530 02

2 DAYS 8 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.71133102

APRIL 26, 1962 05 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .13762389 06 Y -.29843893 06 Z -.11987519 06 DX .53371658 00 DY -.81480283 00 DZ -.26850073 00  
 R .34982309 06 DEC -.20039857 02 RA .29475650 03 V .10103710 01 PTH .80702354 02 AZ .61498535 02  
 R .34982308 06 LAT -.20039858 02 LON .49553214 01 VE .23842545 02 PTE .23968115 01 AZE .27018735 03  
 XS .12257017 09 VS .80198436 08 ZS .34775791 08 DXS -.16798742 02 DYS .22352663 02 DZS .96914227 01  
 XM .12130148 06 YM -.33505547 06 ZM -.12964354 06 DXM .96127727 00 DYM .37325318 00 DZM .70653103-01  
 XT .12130148 06 YT -.33505547 06 ZT -.12964354 06 DXT .96127727 00 DYT .37325318 00 DZT .70653103-01  
 RS .15054764 09 VS .29593292 02 RM .37918816 06 VM .10336168 01 RT .37918816 06 VT .10336168 01  
 GED -.20165456 02 ALT .34344742 06 LOS .10339570 03 RAS .33196975 02 RAM .28990198 03 LDM .10070419 00  
 DUT .34000000 02 DT .19200000 04 DR .99709716 00 SHA .34177100 06 DES .13355673 02 DEM -.19992530 02

## JOBJET

R .34982308 06  
 MIN .33600000 04 HA .23122657 02 DEC -.19908557 02 ELE .49553214 01  
 CKM .34659624 03 CKC .28491190 03 CKT .34669624 03 PSS .10266095 03 PSM .28054235 03  
 UT .55999999 02 DHA .42197299-02 DDE .21869760-04 DEL -.37443696-02 DAZ -.34935591-02  
 ET .55999055 02 RGE .34390612 06 DRG .11509588 01 DDR .25293446-04 SLS .20282287 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10278859 03 POL .29453149 02  
 DT .11471472 01 RFI .00000000 00 RF2 .14630770 06 PRA .29436340 03  
 ESSI -.13142287 03 ESS2 -.15502287 03 F1 .10515511 06 F2 .10737162 06  
 RF .00000000 00 DDP -.16199010-06

2 DAYS 8 HRS. 16 MIN. 7.664 SEC.

JULIAN DATE 2437780.72253083

APRIL 26, 1962 05 20 26.664

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .13813921 06 Y -.29922730 06 Z -.12013481 06 DX .53131710 00 DY -.81463418 00 DZ -.26808923 00  
 R .35078738 06 DEC -.20027544 02 RA .29478055 03 V .10088600 01 PTH .80820685 02 AZ .61135837 02  
 R .35078737 06 LAT -.20027544 02 LON .93630751 00 VE .23912888 02 PTE .23869837 01 AZE .27018631 03  
 XS .12255391 09 VS .80220068 08 ZS .34785159 08 DXS -.16803365 02 DYS .22349673 02 DZS .96901247 01  
 XM .12223125 06 YM -.33469312 06 ZM -.12957472 06 DXM .96039049 00 DYM .37565774 00 DZM .71583464-01  
 XT .12223125 06 YT -.33469312 06 ZT -.12957472 06 DXT .96039049 00 DYT .37565774 00 DZT .71583464-01  
 RS .15054809 09 VS .29593234 02 RM .37914321 06 VM .10337276 01 RT .37914321 06 VT .10337276 01  
 GED -.20153078 02 ALT .34441170 06 LOS .99363288 02 RAS .33207538 02 RAM .29006239 03 LDM .35621814 03  
 DUT .34000000 02 DT .19200000 04 DR .99594048 00 SHA .34273058 06 DES .13359301 02 DEM -.19983935 02

40

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362  
 JOBJET  
 R 35078737 06  
 MIN 33761277 04 HA 27204934 02 DEC -19886723 02 ELE 93630751 00  
 CKM 34662272 03 CKC 28493952 03 CKT 34662272 03 PSS 64301358 02 AZI 27751618 03  
 UT 56268795 02 DHA 42176056-02 DDE 23244735-04 DEL 10270451 03 PSM 44679071 01  
 ET 56267850 02 RGE 34503160 06 DRG 11750890 01 DDR 24559387-04 SLS 28130911-02  
 RDI 63754947 04 PHI 25734820 02 THI 27684780 02 SPS 20285125 03  
 DT 11509014 01 RFI 00000000 00 RF2 10283255 03 PDL 28066491 02  
 ESS1 -13145125 03 ESS2 -15505125 03 F1 10623042 06 PRA 29432410 03  
 RF 00000000 00 DDP -15728887-06 F2 10752617 06

## SELENOCENTRIC

X 15907959 05 Y 35465824 05 Z 94399111 04 DX -42907339 00 DY -11902919 01 DZ -33967270 00  
 R 39999996 05 DEC 13650447 02 RA 65841696 02 V 13100673 01 PTH -85580105 02 AZ 25132207 03  
 R 39999993 05 LAT -92495453 01 LON 31165139 03 VR 13222206 01 PTR -81063684 02 AZR 26521014 03  
 LTS -15103956 01 LNS 28087790 03 LNE -28298481 01 LNE 35411773 03  
 ALT 38261996 05 SHA -20944147 05 ALP 12917051 02 DR -13061712 01 DP 14461547-03 ASD 24902844 01  
 HGE 28243395 03 SVL -70712000 01 HNG 14913945 03 SIA 13039500 03

## EQUATORIAL COORDINATES

## SELENOCENTRIC

EPOCH OF PERICENTER PASSAGE  
 SMA -33310436 04 ECC -14138711 01 INC 15701047 03 JULIAN DATE 2437781.04107422 APRIL 26, 1962 12 59 08.814  
 VH 12129461 01 C3 14712383 01 C1 40384195 04 SLR 33278176 04 APF 27324920 03 RCA 13786227 04  
 TA -13042377 03 EA -16669821 03 MA -57420395 03 DAI -15078692 02 RAI 25034494 03 MTA 13501387 03  
 WX -20070286 00 WY 33505300 00 WZ -92057628 00 PX 42367986 00 PY -81758473 00 PZ -38993831 00  
 QX -88329855 00 QY -46829855 00 QZ 22136896-01 RX 87501629-01 RY 24498800 00 KZ -96556939 00  
 SXO -92409454 00 SYO 24720924 00 SZO 29144416 00 DAO 16944434 02 RAD 16502321 03 TF 63913836 02  
 SXI -32477561 00 SYI 90931021 00 SZI -26014545 00 TX -94173471 00 TY 33635657 00 TZ 00000000 00  
 BX 92425068 00 BY -24676838 00 BZ -29131775 00 MX 89529675 00 MY -31874683 00 MZ -31120256 00  
 B.T -31742869 04 B.R 10045093 04 B 33294348 04 PER 95110982 03 DEF 90027753 02 C3J -17559321 01  
 OP1 90000000 02 OY -96720374 01 OP2 -42885288 02 BRO 43670332 03 M1 -10045093 04 M2 31742869 04  
 BTE -31742869 04 BRE 10045093 04 BTD -33006706 04 ETE 16664480 03 ETS 21204416 01 ETC 25403715 03  
 GP -00000000 00 IR 38209097 04 IHA 16243992 03  
 ZAE 13746402 03 ZAP 14412858 03 ZAC 10877403 03

## EQUATORIAL COORDINATES

2 DAYS 9 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.75299768

APRIL 26, 1962 06 04 19.000

## GEOCENTRIC

X 13952883 06 Y -30137201 06 Z -12083929 06 DX 52438039 00 DY -81513053 00 DZ -26722750 00  
 R 35340559 06 DEC -19994385 02 RA 29484313 03 V 10053970 01 PTH 81184171 02 AZ 59960997 02  
 R 35340558 06 LAT -19994386 02 LON 35000078 03 VE 24104656 02 PTE 23622226 01 AZE 27018350 03  
 XS 12250966 09 YS 80278889 08 ZS 34810673 08 DXS -16815940 02 DYS 22341535 02 DZS 96865923 01  
 XM 12475611 06 YM -33369566 06 ZM -12938296 06 DXM 95794316 00 DYM 38219009 00 DZM 74113555-01  
 XT 12475611 06 YT -33369566 06 ZT -12938296 06 DXT 95794316 00 DYT 38219009 00 DZT 74113555-01  
 RS 15054932 09 VS 29593075 02 RM 37902088 06 VM 10340296 01 RT 37902088 06 VT 10340296 01  
 GED -20119747 02 ALT 34702991 06 LOS 88393924 02 RAS 33236229 06 RAM 29049886 03 LOM 34565651 03  
 DUT 34000000 02 DT 24000000 03 DR 99351931 00 SHA 34533329 06 DES 13369166 02 DEM -19959815 02

## EQUATORIAL COORDINATES



41

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 I STATION PRINTS BK  
 JOBJET UNIFORM TIME LAT LONG  
 R .35340558 06 HA .38298069 02 DEC -.1994386 02  
 MIN .34200000 04 HA .38298069 02 DEC -.1994386 02  
 CKM .34639025 03 CKC .28501912 03 CKT .34639025 03 PSS  
 UT .56999999 02 DHA .42104315-02 DDE .26595757-04 DEL  
 ET .56999055 02 RGE .34820718 06 DRG .12365243 01 DDR  
 RDI .63754947 04 PHI .25734820 02 THI .27684780 02 SPS  
 DT .11614939 01 RFI .00000000 00 RF2 .14603366 06  
 ESS1 -.13153082 03 ESS2 -.15513082 03 F1 .10540455 06 F2 .10791964 06  
 PRA .294222906 03

2 DAYS 10 HRS. 0 MIN. 0.000 SEC. JULIAN DATE 2437780.79466435  
 APRIL 26, 1962 07 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .14139772 06 Y -.30431172 06 Z -.12180025 06 DX .51357974 00 DY -.81868879 00 DZ -.26680871 00  
 R .35697932 06 DEC -.19949814 02 RA .29492182 03 V .10025978 01 PTH .81806095 02 AZ .57695616 02  
 R .35697931 06 LAT -.19949814 02 LON .33503841 03 VE .24368805 02 PTE .23338816 01 AZE .27017970 03  
 XS .12244909 09 YS .80359302 08 ZS .34845537 08 DXS -.16833131 02 DYS .22330396 02 DZS .96817573 01  
 XM .12819858 06 YM -.33230372 06 ZM -.12910992 06 DXM .95451333 00 DYM .39110263 00 DZM .77571741-01  
 XT .12819858 06 YT -.33230372 06 ZT -.12910992 06 DXT .95451333 00 DYT .39110263 00 DZT .77571741-01  
 RS .15055101 09 VS .29592859 02 RM .37885354 06 VM .10344440 01 RT .37885354 06 VT .10344440 01  
 GED -.20074943 02 ALT .35060363 06 LOS .73392154 02 RAS .33275570 02 RAM .29109599 03 LOM .33121257 03  
 DUT .34000000 02 DT .95999999 03 DR .99236269 00 SHA .34887830 06 DES .13382651 02 DEM -.19925080 02

## JOBJET

R .35697931 06 I UNIFORM TIME LAT LONG  
 MIN .34800000 04 HA .53434005 02 DEC -.19949814 02  
 CKM .34596094 03 CKC .28513495 03 CKT .34596094 03 PSS  
 UT .58000000 02 DHA .41980090-02 DDE .33087103-04 DEL  
 ET .57999055 02 RGE .35279170 06 DRG .13076594 01 DDR  
 RDI .63754947 04 PHI .25734820 02 THI .27684780 02 SPS  
 DT .11767863 01 RFI .00000000 00 RF2 .14580585 06  
 ESS1 -.13164444 03 ESS2 -.15524444 03 F1 .10564014 06 F2 .10837522 06  
 PRA .29413419 03

2 DAYS 11 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.83633102

APRIL 26, 1962 08 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .14322380 06 Y -.30727231 06 Z -.12276178 06 DX .50039084 00 DY -.82708338 00 DZ -.26762668 00  
 R .36055482 06 DEC -.19906133 02 RA .29499087 03 V .10030364 01 PTH .82630247 02 AZ .54023842 02  
 R .36055481 06 LAT -.19906133 02 LON .32006638 03 VE .24637250 02 PTE .23139946 01 AZE .27017591 03  
 XS .12238845 09 YS .80439677 08 ZS .34880384 08 DXS -.16850314 02 DYS .22319247 02 DZS .96769179 01  
 XM .13162852 06 YM -.33087974 06 ZM -.12882444 06 DXM .95098785 00 DYM .39998984 00 DZM .81027307-01  
 XT .13162852 06 YT -.33087974 06 ZT -.12882444 06 DXT .95098785 00 DYT .39998984 00 DZT .81027307-01  
 RS .15055270 09 VS .29592644 02 RM .37886816 06 VM .10348600 01 RT .37886816 06 VT .10348600 01  
 GED -.20031034 02 ALT .35417911 06 LOS .58390396 02 RAS .33314873 02 RAM .29169334 03 LOM .31676887 03  
 DUT .34000000 02 DT .48000000 03 DR .99475030 00 SHA .35241390 06 DES .13396131 02 DEM -.19888320 02

42

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 JETGOLD-3 1 UNIFORM TIME TAU .00000000 00  
 R .36055481 06 LAT .19906133 02 LONG  
 MIN .35400000 04 HA .28226818 03 DEC -.20515490 02 ELE  
 CKM .34410631 03 CKC .28404227 03 CKT .34410631 03 PSS  
 UT .59000000 02 DHA .41765632-02 DDE -.69079826-05 DEL  
 ET .58999055 02 RGE .36074590 06 DRG .64740834 00 DDR  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS  
 DT .12033186 01 RFI .00000000 00 RF2 .00000000 00 SPS  
 ESS1 -.13183810 03 ESS2 -.15543810 03 F1 .10358915 06 F2 .10414650 06  
 .11366904 03 AZI  
 .31385600 01 PSM  
 .23547915-02 DAZ  
 .20323810 03 SLS  
 .22702976 03 POL  
 .29585168 03 PRA

JOBJET 1 UNIFORM TIME TAU .00000000 00  
 R .36055481 06 LAT .19906133 02 LONG  
 MIN .35400000 04 HA .68521664 02 DEC -.19606104 02 ELE  
 CKM .34531709 03 CKC .28525305 03 CKT .34531709 03 PSS  
 UT .59000000 02 DHA .41838709-02 DDE .32132705-04 DEL  
 ET .58999055 02 RGE .35760036 06 DRG .13605915 01 DDR  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS  
 DT .11928262 01 RFI .00000000 00 RF2 .00000000 00 BFI  
 ESS1 -.13176203 03 ESS2 -.15536203 03 F1 .10379258 06 F2 .10871426 06  
 .26013102 03 AZI  
 .30825546 01 PSM  
 -.14512909-02 DAZ  
 .20316203 03 SLS  
 .29396678 02 PDL  
 .29408760 03 PRA

APRIL 26, 1962 09 04 19.000

JULIAN DATE 2437780.87799768

2 DAYS 12 HRS. 0 MIN. 0.000 SEC.

## GEOCENTRIC

## EQUATORIAL COORDINATES

X .14499555 06 Y -.31027605 06 Z -.12372946 06 DX .48295525 00 DY -.84336019 00 DZ -.27038325 00  
 R .36414820 06 DEC -.19863334 02 RA .29504722 03 V .10087662 01 PTH .83747340 02 AZ .47104288 02  
 R .36414818 06 LAT -.19863334 02 LON .30508158 03 VE .24914100 02 PTE .23067145 01 AZE .27017212 03  
 XS .12232776 09 YS .80520009 08 ZS .34915215 08 DXS -.16867490 02 DYS .22308085 02 DZS .96720734 01  
 XM .13504560 06 YM -.32942382 06 ZM -.12852653 06 DXM .94736679 00 DYM .40885080 00 DZM .84479912-01  
 XT .13504560 06 YT -.32942382 06 ZT -.12852653 06 DXT .94736679 00 DYT .40885080 00 DZT .84479912-01  
 RS .15055439 09 VS .29592429 02 RM .37851873 06 VM .10352776 01 RT .37851873 06 VT .10352776 01  
 GED -.19988012 02 ALT .35777248 06 LOS .43388633 02 RAS .33354178 02 RAM .29229093 03 LOM .30232538 03  
 DUT .34000000 02 DT .48000000 03 DR .10027653 01 SHA .355595179 06 DES .13409604 02 DEM -.19849538 02

JETGOLD-3 1 UNIFORM TIME TAU .00000000 00  
 R .36414818 06 LAT .19863334 02 LONG  
 MIN .36000000 04 HA .29733910 03 DEC -.20537281 02 ELE  
 CKM .34292850 03 CKC .28402184 03 CKT .34292850 03 PSS  
 UT .59999999 02 DHA .41961301-02 DDE -.43734342-05 DEL  
 ET .59999055 02 RGE .36313798 06 DRG .68658406 00 DDR  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS  
 DT .12112977 01 RFI .00000000 00 RF2 .03000000 00 BFI  
 ESS1 -.13189550 03 ESS2 -.15549550 03 F1 .10370001 06 F2 .10439741 06  
 .12271554 03 AZI  
 .26275511 01 PSM  
 .26989009-02 DAZ  
 .20329550 03 SLS  
 .23283710 03 POL  
 .29582183 03 PRA

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK  
 JORJET I UNIFORM TIME TAU .00000000 00  
 R .36414818 06 LAI -.19863334 02 LONG .30508168 03  
 MIN .36000000 04 HA .83557876 02 DEC -.19489042 02 ELE .13894972 02  
 CKM .34427403 03 CKC .28536737 03 CKT .34427403 03 PSS .10300146 03  
 UT .59999999 02 DHA .41697546-02 DDE .32645318-04 DEL -.36373014-02 DAZ -.15358087-02  
 ET .59999055 02 RGE .36256456 06 DRG .13941492 01 DDR -.17014118 39 SLS .20328178 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10313583 03  
 DT .12093850 01 RFI .00000000 00 RF2 .00000000 00 BFI .14552883 06  
 ESS1 -.13188178 03 ESS2 -.15548177 03 F1 .10590345 06 F2 .10892919 06 PRA .29409245 03

2 DAYS 13 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.91966435

APRIL 26, 1962 10 04 19.000

## GEOCENTRIC

## EQUATORIAL COORDINATES

X\* .14669101 06 Y -.31336153 06 Z -.12471253 06 DX .45687694 00 DY -.87413789 00 DZ -.27652461 00  
 R .36778650 06 DEC -.19821408 02 RA .29508526 03 V .10243629 01 PTH .85202618 02 AZ .30265428 02  
 R .36778649 06 LAI -.19821408 02 LON .29007855 03 VE .25208081 02 PTE .23207651 01 AZE .27016832 03  
 XS .12226700 09 YS .80600301 08 ZS .34950028 08 DXS -.16884657 02 DYS .22296913 02 DZS .96672244 01  
 XM .13844947 06 YM -.32793604 06 ZM -.12821619 06 DXM .94365028 00 DYM .41768458 00 DZM .87929216-01  
 XT .13844947 06 YT -.32793604 06 ZT -.12821619 06 DXT .94365028 00 DYT .41768458 00 DZT .87929216-01  
 RS .15055607 09 VS .29592215 02 RM .37835128 06 VM .10356968 01 RT .37835128 06 VT .10356968 01  
 GED -.19945867 02 ALT .36141077 06 LOS .28386871 02 RAS .33393488 02 RAM .29288871 03 LOM .28788209 03  
 UUT .34000000 02 DT .24000000 03 DR .10207743 01 SHA .35951095 06 DES .13423071 02 DEM -.19808732 02

## JEIGOLD-3

R .36778649 06 I UNIFORM TIME TAU .00000000 00  
 MIN .36600000 04 HA .31248016 03 DEC -.19821408 02 LONG .29007865 03  
 CKM .34092070 03 CKC .28402253 03 CKT .34092070 03 PSS .10171719 03  
 UT .61000000 02 DHA .42156269-02 DDE -.17680605-05 DEL .25080088-02 DAZ .32121107-02  
 ET .60999055 02 RGE .36572743 06 DRG .75766704 00 DDR -.17014118 39 SLS .20335722 03  
 RDI .63720164 04 PHI .35116540 02 THI .24319539 03 SPS .10185340 03  
 DT .12199352 01 RFI .00000000 00 RF2 .00000000 00 BFI .14756730 06  
 ESS1 -.13195722 03 ESS2 -.15555722 03 F1 .10393560 06 F2 .10485268 06 PRA .29572184 03

## JORJET

R .36778649 06 I UNIFORM TIME TAU .00000000 00  
 MIN .36600000 04 HA .93546653 02 DEC -.19821408 02 LONG .29007865 03  
 CKM .34237109 03 CKC .28547292 03 CKT .34237109 03 PSS .10163936 01  
 UT .61000000 02 DHA .41579865-02 DDE .31654242-04 DEL -.35091802-02 DAZ -.17533129-02  
 ET .60999055 02 RGE .36761816 06 DRG .14112243 01 DDR -.17014118 39 SLS .20340201 03  
 RDI .63754947 04 PHI -.25734820 02 THI .27684780 02 SPS .10310922 03  
 DT .12262420 01 RFI .00000000 00 RF2 .00000000 00 BFI .14547415 06  
 ESS1 -.13200201 03 ESS2 -.15560201 03 F1 .10595888 06 F2 .10903856 06 PRA .29414474 03

2 DAYS 14 HRS. 0 MIN. 0.000 SEC.

JULIAN DATE 2437780.96133102

APRIL 26, 1962 11 04 19.000

45

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS BK

GEOCENTRIC

EQUATORIAL COORDINATES		EQUATORIAL COORDINATES	
RA	DEC	RA	DEC
14946061 06	32378617 06	15337911 01	23564082 00
37879597 06	19703527 02	37296236 02	27537968 03
37879596 06	19703527 02	22259817 01	27027413 03
12209890 09	80821826 08	22266002 02	96538085 01
14777792 06	32366292 06	44193035 00	97434518-01
14777792 06	32366292 06	44193035 00	97434518-01
15056074 09	29591626 02	37788881 06	10368624 01
19827367 02	37242022 06	29454048 03	24799760 03
34000000 02	59999999 02	13460227 02	19685543 02

JETGOLD-3

EQUATORIAL COORDINATES		EQUATORIAL COORDINATES	
RA	DEC	RA	DEC
37879596 06	19703527 02	17420723 03	29485283 03
38256913 04	35488543 03	24823530 03	34174060 02
19637088 03	28420924 03	10262253 03	38907263-03
63761522 02	44669598-02	17014118 39	10276178 03
63760577 02	37518006 06	14669644 06	10659422 06
63720164 04	35116540 02	10659422 06	10659422 06
12514658 01	00000000 00	10659422 06	10659422 06
13217887 03	15577886 03	10659422 06	10659422 06

OOMJET

EQUATORIAL COORDINATES		EQUATORIAL COORDINATES	
RA	DEC	RA	DEC
37879596 06	19703527 02	17420723 03	29485283 03
38256913 04	35488543 03	24823530 03	34174060 02
19637088 03	28420924 03	10262253 03	38907263-03
63761522 02	44669598-02	17014118 39	10276178 03
63760577 02	37518006 06	14669644 06	10659422 06
63720164 04	35116540 02	10659422 06	10659422 06
12514658 01	00000000 00	10659422 06	10659422 06
13217887 03	15577886 03	10659422 06	10659422 06

GEOCENTRIC

EQUATORIAL COORDINATES		EQUATORIAL COORDINATES	
RA	DEC	RA	DEC
14946061 06	32378617 06	15337911 01	23564082 00
37879597 06	19703527 02	37296236 02	27537968 03
37879596 06	19703527 02	22259817 01	27027413 03
12209890 09	80821826 08	22266002 02	96538085 01
14777792 06	32366292 06	44193035 00	97434518-01
14777792 06	32366292 06	44193035 00	97434518-01
15056074 09	29591626 02	37788881 06	10368624 01
19827367 02	37242022 06	29454048 03	24799760 03
34000000 02	59999999 02	13460227 02	19685543 02

46

## SPACE TRAJECTORIES

CASE 1

RANGER-4 ORBIT 042362 STATION PRINTS HK

## SELENOCENTRIC

## EQUATORIAL COORDINATES

X	.16826879	04	Y	-.12325529	03	Z	-.41752379	03	DX	-.17579949	01	DY	-.19757214	01	DZ	-.33307534	00
R	.17380899	04	DEC	-.13899518	02	RA	.35581052	03	V	.26655131	01	PTH	-.33774837	02	AZ	.25131470	03
R	.17380897	04	LAT	-.11964336	02	LON	.23145038	03	VR	.26692561	01	PIR	-.33721113	02	AZR	.27641480	03
LTS	-.15088972	01	LNS	.27707041	03	LTE	-.23842619	01	LNE	.35420805	03						
ALT	.89950561-01		SHA	-.12589763	04	ALP	.16926396	03	DR	-.14818404	01	DP	.73038480-01		ASD	.89417046	02
HGE	.28269402	03	SVL	-.12358062	02	HNG	.22510696	03	SIA	-.30990916	02						

## SELENOCENTRIC

## CONIC

## EQUATORIAL COORDINATES

EPUCH OF PERICENTER	PASSAGE	JULIAN DATE	2437781.04080816	APRIL 26, 1962	12 58 45.825												
SMA	-.3435992	04	ECC	.13802332	01	INC	.15686102	03	LAN	.21119677	03	APF	.27521081	03	RCA	.12713477	04
VH	.12106666	01	C3	.14657136	01	CI	.38510007	04	SLR	.30261040	04	APD	.00000000	00	TFP	-.52534139	03
TA	-.57526939	02	FA	-.25556337	02	MA	-.10898698	02	DAI	-.15006686	02	RAI	.25004861	03	MTA	.13642853	03
WX	-.20354641	00	WY	.33613770	00	WZ	-.91955440	00	PX	.39665389	00	PY	-.83037322	00	PZ	-.39133870	00
QX	-.89511704	00	QY	-.44440042	00	QZ	.35689150-01		RX	.88353401-01		RY	.24339133	00	RZ	-.96589558	00
SXD	-.90434908	00	SYD	.29531114	00	SZD	.30812991	00	DAD	.17946564	02	RAD	.16191578	03	TF	.63907450	02
SXI	-.32958551	00	SYI	-.90792494	00	SZI	-.25893177	00	TX	-.93998247	00	TY	.34122271	00	IZ	.00000000	00
BX	.92192313	00	BY	-.25036718	00	BZ	-.29559098	00	MX	-.14595645	00	MY	-.93913929	00	MZ	-.31098890	00
B.T	.30282814	04	B.R	.97344177	03	B	.31808925	04	PER	.88999164	03	DEF	.92857068	02	C3J	-.17709633	01
OP1	.90000000	02	OY	-.11006536	02	OP2	-.24549167	02									
HFE	-.30282814	04	HRE	.97344177	03	HID	-.31521697	04	BRO	.42650202	03	M1	-.97344177	03	M2	.30282814	04
Gp	-.00000000	00	IR	.38266166	04	THA	.16217998	03	ETE	.16704042	03	ETS	.22720265	01	ETC	.25386001	03
ZAE	.13716624	03	ZAP	.14471887	03	ZAC	.10876410	03									

614744547542	215472620534	213636320606	604426727545	603463165640	603445451541
	620402321		419000		000000000000

## APPENDIX E

## History of Ground Modes and Transmitter VCO Frequencies

Table E-1 consists of a history of *Ranger 4* DSIF tracking by station, date, and ground mode.

Table E-1. *Ranger 4* DSIF 4 tracking

Station	Date	Ground Mode	From, GMT	To, GMT	Station	Date	Ground Mode	From, GMT	To, GMT
DSIF 1	23/24 April	GM-1	21:25:52	23:05:00	DSIF 2	25 April	GM-4	08:47:30	09:30:00
		GM-3	23:07:00	23:36:00			Searched for transponder	09:31:20	10:00:00
		GM-1	23:40:00	00:06:00			GM-4	10:00:09	13:00:00
		GM-3	00:07:34	07:23:00			Searched for transponder	13:00:17	13:30:00
DSIF 5		GM-3	21:14:37	23:05:43	DSIF 4	25/26 April	GM-4	13:31:39	17:30:17
		GM-1	23:07:55	23:36:00			Searched for transponder	17:30:18	17:48:20
		GM-3	23:39:54	00:06:00			GM-4	14:23:00	15:03:00
		GM-1	00:07:54	02:40:00			Searched for transponder	15:03:32	15:33:37
		GM-2	02:40:55	02:41:32			GM-4	15:35:08	19:56:42
		GM-1	02:42:00	07:21:50			Searched for transponder	19:59:26	20:30:00
DSIF 4		GM-4	08:14:30	08:43:20	DSIF 4	25/26 April	GM-4	20:30:35	01:27:55
		GM-3	22:22:00	22:40:00			Searched for transponder	01:30:00	02:00:00
		GM-4	22:43:00	23:00:00			GM-4	02:01:50	02:13:06
		GM-3	23:00:10	23:35:00			GM-4	21:40:13	23:07:00
		GM-2	23:36:04	23:37:00			Searched for transponder	23:08:00	23:38:00
DSIF 2	24 April	GM-3	23:38:36	00:06:00	DSIF 5		GM-4	23:38:00	03:00:00
		GM-4	08:32:40	17:03:13			Searched for transponder	03:03:00	03:32:00
		GM-4	09:00:40	12:28:57			GM-4	03:33:00	07:00:00
		Searched for transponder	12:30:05	13:04:00			Searched for transponder	07:00:30	07:30:00
DSIF 3		GM-4	13:05:00	15:25:00	DSIF 3	26 April	GM-4	07:30:00	09:32:08
		Searched for transponder	15:30:00	16:00:00			GM-4	08:33:00	09:52:00
		GM-4	16:04:00	17:04:40			Searched for transponder	09:52:00	10:25:00
		GM-4	13:52:44	15:00:00			GM-4	10:25:00	12:47:54*
DSIF 4	24/25 April	Searched for transponder	15:00:00	15:31:55	DSIF 2		Searched for capsule	12:47:54	13:31:00
		GM-4	15:58:47	18:23:00			GM-4	08:46:00	09:40:50
		Searched for transponder	20:00:00	20:30:00			Searched for transponder	09:42:00	09:47:42
		GM-4	20:31:21	01:00:00			GM-4	09:48:40	12:47:47*
		Searched for transponder	01:20:00	01:30:00			Searched for capsule	12:47:47	13:32:10
		GM-4	01:31:00	01:58:59					
DSIF 5		GM-4	21:21:35	06:20:00					
		Searched for transponder	06:20:00	06:50:00					
		GM-4	06:50:00	09:25:11					

\* Loss of signal at lunar occultation.

Table E-2 consists of a history of the transmitter VCO frequency during the transponder tracking period.

**Table E-2. Transmitter VCO frequencies**

Station transmitting	Date	Time, GMT	VCO frequency, cps	Station transmitting	Date	Time, GMT	VCO frequency, cps				
DSIF 1	23 April	21:30:00	29668226.0	DSIF 5	24 April	01:10:00	29668599.0				
		21:35:00	29668227.0			01:20:00	29668598.0				
		21:40:00	29668227.0			01:30:00	29668597.0				
		21:45:00	29668227.0			01:40:00	29668596.0				
		21:50:00	29668226.0			01:50:00	29668601.4				
		21:55:00	29668226.0			02:00:00	29668613.1				
		22:00:00	29668226.0			02:10:00	29668012.0				
		22:05:00	29668226.0			02:20:00	29668017.8				
		22:10:00	29668225.0			02:30:00	29668018.0				
		22:15:00	29668225.0			02:40:00	29668056.0				
		22:20:00	29668225.0			02:50:00	29668056.0				
		22:25:00	29668225.0			03:00:00	29668060.0				
		22:30:00	29668225.0			03:10:00	29668061.0				
		22:35:00	29668226.0			03:20:00	29668011.0				
		22:40:00	29668225.0			03:30:00	29668011.0				
		22:45:00	29668226.0			03:40:00	29668012.0				
		22:50:00	29668228.0								
		22:55:00	29668228.0								
		23:00:00	29668228.0								
		23:05:00	29668228.0								
		DSIF 5	24 April			23:20:00	29668224.0			04:20:00	29668012.0
						23:25:00	29668224.0			04:30:00	29668012.0
						23:30:00	29668224.0			04:40:00	29668011.0
23:35:00	29668225.0					05:10:00	29668264.2				
DSIF 1	23:40:00	29668203.0				05:20:00	29668264.1				
	23:45:00	29668203.0				05:30:00	29668264.0				
	23:50:00	29668203.0				05:40:00	29668264.0				
	23:55:00	29668204.0				05:50:00	29668263.8				
DSIF 5	00:00:00	29668203.0				06:00:00	29668263.8				
	00:05:00	29668204.0				06:10:00	29668263.7				
	00:10:00	29668598.0				06:20:00	29668263.7				
	00:20:00	29668600.0				06:30:00	29668263.5				
	00:30:00	29668601.0				06:40:00	29668263.6				
	00:40:00	29668600.0				06:50:00	29668263.3				
DSIF 5	00:50:00	29668600.0				07:00:00	29668263.3				
	01:00:00	29668599.0				07:10:00	29668263.3				
						07:20:00	29668263.3				

## **APPENDIX F**

### **Final Orbit Residual Listing**

This Appendix consists of a listing of final orbit residuals.



TIME	EL/DEC	AZ/HA	C1/C2/C3/A.	RANGE
212931.000	.0000000 00 0	.0000	.0000	.0000000 00 0
212941.000	.0000000 00 0	.0000	.13640809 06 1	.9082
212951.000	.0000000 00 0	.0000	.0000	.6816
213011.000	.0000000 00 0	.0000	.13649132 06 1	.3730
213021.000	.0000000 00 0	.0000	.13671363 06 1	.3730
213031.000	.0000000 00 0	.0000	.13677919 06 1	-1.1934
213041.000	.0000000 00 0	.0000	.13684074 06 1	-7.617
213051.000	.0000000 00 0	.0000	.13689849 06 1	.5076
213101.000	.0000000 00 0	.0000	.13695253 06 1	.4727
213111.000	.0000000 00 0	.0000	.13700301 06 1	-1.0117
213121.000	.0000000 00 0	.0000	.13705008 06 1	.9160
213131.000	.0000000 00 0	.0000	.13709387 06 1	-8.730
213141.000	.0000000 00 0	.0000	.13713451 06 1	.4922
213151.000	.0000000 00 0	.0000	.13717211 06 1	-1.1074
213201.000	.0000000 00 0	.0000	.13720679 06 1	.2109
213211.000	.0000000 00 0	.0000	.13723866 06 1	.3359
213221.000	.0000000 00 0	.0000	.13726784 06 1	1.1602
213231.000	.0000000 00 0	.0000	.13729442 06 1	-4.219
213241.000	.0000000 00 0	.0000	.13731850 06 1	.4961
213251.000	.0000000 00 0	.0000	.13734018 06 1	.8145
213301.000	.0000000 00 0	.0000	.13735956 06 1	-5.566
213311.000	.0000000 00 0	.0000	.13737670 06 1	.2949
213321.000	.0000000 00 0	.0000	.13739171 06 1	.2852
213331.000	.0000000 00 0	.0000	.13740467 06 1	-6.699
213341.000	.0000000 00 0	.0000	.13741564 06 1	.3555
213351.000	.0000000 00 0	.0000	.13742471 06 1	.2852
213401.000	.0000000 00 0	.0000	.13743195 06 1	.0488
213411.000	.0000000 00 0	.0000	.13743743 06 1	-4.277
213421.000	.0000000 00 0	.0000	.13744121 06 1	-2.070
213431.000	.0000000 00 0	.0000	.13744335 06 1	-3.555
213441.000	.0000000 00 0	.0000	.13744393 06 1	-9.297
213451.000	.0000000 00 0	.0000	.13744299 06 1	-9.941
213501.000	.0000000 00 0	.0000	.13744060 06 1	-6.016
213511.000	.0000000 00 0	.0000	.13743681 06 1	.1875
213521.000	.0000000 00 0	.0000	.13743168 06 1	.3242
213531.000	.0000000 00 0	.0000	.13742524 06 1	.7576
213541.000	.0000000 00 0	.0000	.13741756 06 1	-5.605
213551.000	.0000000 00 0	.0000	.13740868 06 1	-6.797
213601.000	.0000000 00 0	.0000	.13739864 06 1	-6.626
213611.000	.0000000 00 0	.0000	.13738749 06 1	-4.941
213621.000	.0000000 00 0	.0000	.13737527 06 1	-1.2754
213631.000	.0000000 00 0	.0000	.13736203 06 1	-0.0293
213641.000	.0000000 00 0	.0000	.13734779 06 1	.2090
213651.000	.0000000 00 0	.0000	.13733326 06 1	.4004
213701.000	.0000000 00 0	.0000	.13731649 06 1	-4.922
213711.000	.0000000 00 0	.0000	.13729930 06 1	-5.539
213721.000	.0000000 00 0	.0000	.13728167 06 1	.3340
213731.000	.0000000 00 0	.0000	.13726301 06 1	-0.096
213741.000	.0000000 00 0	.0000	.13724357 06 1	-5.5703
213751.000	.0000000 00 0	.0000	.13722337 06 1	-1.3750
213801.000	.0000000 00 0	.0000	.13718084 06 1	.1641
213811.000	.0000000 00 0	.0000	.13715854 06 1	.4551
213821.000	.0000000 00 0	.0000	.13713561 06 1	.3926
213831.000	.0000000 00 0	.0000	.13711205 06 1	-0.508
213841.000	.0000000 00 0	.0000	.13708790 06 1	1.1035
213851.000	.0000000 00 0	.0000	.13706317 06 1	.8

TIME	EL/DEC	JEJMTS		C1/C2/C3/R.	RANGE	ITERATION 3
		AZ/HA	CL/HA			
213921.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13698577 06 1	1.2305	.0000
213931.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13695897 06 1	-.9668	.0000
213941.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13693170 06 1	-.3047	.0000
213951.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13690397 06 1	1.0273	.0000
214001.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13687582 06 1	-.1797	.0000
214011.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13684725 06 1	-.2539	.0000
214021.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13681829 06 1	-.2871	.0000
214031.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13678894 06 1	1.0586	.0000
214041.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13675923 06 1	-.7695	.0000
214051.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13672917 06 1	-.1680	.0000
214101.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13669877 06 1	-.7715	.0000
214111.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13666805 06 1	-.0547	.0000
214121.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13663703 06 1	-.9727	.0000
214131.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13660571 06 1	-.7090	.0000
214141.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13657411 06 1	-.1074	.0000
214151.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13654223 06 1	-.2363	.0000
214201.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13651011 06 1	-.1094	.0000
214211.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13647773 06 1	-.2637	.0000
214221.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13644513 06 1	-.1289	.0000
214231.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13641230 06 1	-.2969	.0000
214241.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13637925 06 1	-.7461	.0000
214251.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13634600 06 1	-.9961	.0000
214301.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13631256 06 1	-.5625	.0000
214311.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13627894 06 1	-.9375	.0000
214321.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13624514 06 1	-.8633	.0000
214331.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13621117 06 1	-.1699	.0000
214341.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13617705 06 1	-.0469	.0000
214351.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13614277 06 1	-.2266	.0000
214401.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13610836 06 1	-.6426	.0000
214411.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13607381 06 1	-.8086	.0000
214421.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13603913 06 1	-1.1328	.0000
214431.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13600434 06 1	-.3398	.0000
214441.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13596943 06 1	-.4316	.0000
214451.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13593442 06 1	-.5801	.0000
214501.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13589931 06 1	-.3066	.0000
214511.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13586411 06 1	-.1055	.0000
214521.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13582881 06 1	-.1855	.0000
214531.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13579344 06 1	-.5586	.0000
214541.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13575800 06 1	-.0039	.0000
214551.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13572248 06 1	-.5195	.0000
214601.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13568690 06 1	-.1016	.0000
214611.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13565126 06 1	-.2617	.0000
214621.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13561556 06 1	-.5664	.0000
214631.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13557982 06 1	-.8242	.0000
214641.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13554404 06 1	-1.0371	.0000
214651.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13550821 06 1	-.7910	.0000
214701.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13547234 06 1	-.6543	.0000
214711.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13543645 06 1	-.5469	.0000
214721.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13540053 06 1	-.5313	.0000
214731.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13536458 06 1	-.4160	.0000
214741.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13532862 06 1	-.6191	.0000
214751.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13529264 06 0	9.3613	.0000
214801.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13525664 06 1	-.3555	.0000
214811.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13522064 06 1	-.3594	.0000
214821.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13518463 06 1	-.3652	.0000
214831.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13514862 06 1	-.6230	.0000

## ITERATION 3

## JETMTS

TIME	EL/DEC	AZ/HA		C1/C2/C3/R-		RANGE	
214841.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13511261 06 1	-.6133	.00000000 00 0
214851.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13507660 06 0	-6.6055	.00000000 00 0
214901.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13504061 06 1	-.6074	.00000000 00 0
214911.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13500462 06 1	.3828	.00000000 00 0
214921.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13496864 06 1	.3594	.00000000 00 0
214931.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13493268 06 1	1.3223	.00000000 00 0
214941.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13489673 06 1	1.2676	.00000000 00 0
214951.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13486081 06 1	1.1914	.00000000 00 0
215001.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13482490 06 1	.0957	.00000000 00 0
215011.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13478902 06 1	-.0254	.00000000 00 0
215021.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13475318 06 1	-.1758	.00000000 00 0
215031.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13471735 06 1	-.3516	.00000000 00 0
215041.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13468156 06 1	.4395	.00000000 00 0
215051.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13464580 06 1	.1992	.00000000 00 0
215101.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13461008 06 1	-.0781	.00000000 00 0
215111.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13457439 06 1	-.3926	.00000000 00 0
215131.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13450314 06 1	.8633	.00000000 00 0
215141.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13446757 06 1	.4277	.00000000 00 0
215151.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13443205 06 1	-.0527	.00000000 00 0
215201.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13439658 06 1	.4238	.00000000 00 0
215211.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13436115 06 1	.8535	.00000000 00 0
215221.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13432577 06 1	-.7656	.00000000 00 0
215231.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13429043 06 1	-.5645	.00000000 00 0
215241.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13425516 06 1	-1.1563	.00000000 00 0
215251.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13421993 06 1	-.9297	.00000000 00 0
215301.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13418476 06 1	-.7559	.00000000 00 0
215311.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13414964 06 1	.3613	.00000000 00 0
215321.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13411457 06 1	-.5762	.00000000 00 0
215331.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13407957 06 1	.4297	.00000000 00 0
215341.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13404462 06 1	-.6250	.00000000 00 0
215351.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13400974 06 1	.2617	.00000000 00 0
215401.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13397491 06 1	1.0898	.00000000 00 0
215411.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13394015 06 1	.8535	.00000000 00 0
215421.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13390544 06 1	.5566	.00000000 00 0
215431.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13387080 06 1	1.1953	.00000000 00 0
215441.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13383623 06 1	-.2285	.00000000 00 0
215451.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13380172 06 1	.2832	.00000000 00 0
215501.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13376727 06 1	-.2734	.00000000 00 0
215511.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13373289 06 1	-.8945	.00000000 00 0
215521.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13369858 06 1	.4160	.00000000 00 0
215531.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13366434 06 1	-.3398	.00000000 00 0
215541.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13363017 06 1	.8320	.00000000 00 0
215551.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13359606 06 1	-.0645	.00000000 00 0
215601.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13356203 06 1	-1.0273	.00000000 00 0
215611.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13352806 06 1	-.0645	.00000000 00 0
215621.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13349417 06 1	-1.1719	.00000000 00 0
215631.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13346035 06 1	.6504	.00000000 00 0
215641.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13342660 06 1	-.5996	.00000000 00 0
215651.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13339292 06 1	1.0762	.00000000 00 0
215701.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13335932 06 1	.6777	.00000000 00 0
215711.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13332579 06 1	.2090	.00000000 00 0
215721.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13329233 06 1	.6641	.00000000 00 0
215731.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13325895 06 1	.0449	.00000000 00 0
215741.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13322565 06 1	.3496	.00000000 00 0
215751.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13319242 06 1	.5801	.00000000 00 0
215801.000	.00000000 00 0	.0000	.00000000 00 0	.0000	.13315926 06 1	-.2637	.00000000 00 0

## JETMYS ITERATION 3

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE
215811.000	.00000000 00 0	.00000000 00 0	.0000	.8145
215821.000	.00000000 00 0	.00000000 00 0	.0000	-.1816
215831.000	.00000000 00 0	.00000000 00 0	.0000	.7441
215841.000	.00000000 00 0	.00000000 00 0	.0000	.5938
215851.000	.00000000 00 0	.00000000 00 0	.0000	.3672
215901.000	.00000000 00 0	.00000000 00 0	.0000	-.9395
215911.000	.00000000 00 0	.00000000 00 0	.0000	-.3223
215921.000	.00000000 00 0	.00000000 00 0	.0000	-.7832
215931.000	.00000000 00 0	.00000000 00 0	.0000	.6777
215941.000	.00000000 00 0	.00000000 00 0	.0000	.0625
215951.000	.00000000 00 0	.00000000 00 0	.0000	-.6348
220001.000	.00000000 00 0	.00000000 00 0	.0000	.5918
220011.000	.00000000 00 0	.00000000 00 0	.0000	-.2598
220021.000	.00000000 00 0	.00000000 00 0	.0000	-.1914
220031.000	.00000000 00 0	.00000000 00 0	.0000	-.2012
220041.000	.00000000 00 0	.00000000 00 0	.0000	-1.2930
220051.000	.00000000 00 0	.00000000 00 0	.0000	.5391
220101.000	.00000000 00 0	.00000000 00 0	.0000	.2891
220111.000	.00000000 00 0	.00000000 00 0	.0000	-.0391
220121.000	.00000000 00 0	.00000000 00 0	.0000	-.4434
220131.000	.00000000 00 0	.00000000 00 0	.0000	.0703
220141.000	.00000000 00 0	.00000000 00 0	.0000	.5020
220151.000	.00000000 00 0	.00000000 00 0	.0000	.8574
220201.000	.00000000 00 0	.00000000 00 0	.0000	1.1309
220211.000	.00000000 00 0	.00000000 00 0	.0000	.3262
220221.000	.00000000 00 0	.00000000 00 0	.0000	.4414
220231.000	.00000000 00 0	.00000000 00 0	.0000	-.5234
220241.000	.00000000 00 0	.00000000 00 0	.0000	.4316
220251.000	.00000000 00 0	.00000000 00 0	.0000	-.6934
220301.000	.00000000 00 0	.00000000 00 0	.0000	-.8965
220311.000	.00000000 00 0	.00000000 00 0	.0000	-1.1797
220321.000	.00000000 00 0	.00000000 00 0	.0000	-.5430
220331.000	.00000000 00 0	.00000000 00 0	.0000	-.9863
220341.000	.00000000 00 0	.00000000 00 0	.0000	.4922
220351.000	.00000000 00 0	.00000000 00 0	.0000	.8906
220401.000	.00000000 00 0	.00000000 00 0	.0000	1.2109
220501.000	.00000000 00 0	.00000000 00 0	.0000	.4590
220511.000	.00000000 00 0	.00000000 00 0	.0000	-.7754
220521.000	.00000000 00 0	.00000000 00 0	.0000	-.0898
220531.000	.00000000 00 0	.00000000 00 0	.0000	.5176
220541.000	.00000000 00 0	.00000000 00 0	.0000	-.0469
220551.000	.00000000 00 0	.00000000 00 0	.0000	.4980
220601.000	.00000000 00 0	.00000000 00 0	.0000	-.1289
220611.000	.00000000 00 0	.00000000 00 0	.0000	-.8359
220621.000	.00000000 00 0	.00000000 00 0	.0000	-.6191
220631.000	.00000000 00 0	.00000000 00 0	.0000	.5195
220641.000	.00000000 00 0	.00000000 00 0	.0000	-.4199
220651.000	.00000000 00 0	.00000000 00 0	.0000	-.4375
220701.000	.00000000 00 0	.00000000 00 0	.0000	-.5332
220711.000	.00000000 00 0	.00000000 00 0	.0000	1.2949
220721.000	.00000000 00 0	.00000000 00 0	.0000	.0469
220731.000	.00000000 00 0	.00000000 00 0	.0000	-.2793
220741.000	.00000000 00 0	.00000000 00 0	.0000	-.6836
220751.000	.00000000 00 0	.00000000 00 0	.0000	-.1621
220801.000	.00000000 00 0	.00000000 00 0	.0000	-.2813
220811.000	.00000000 00 0	.00000000 00 0	.0000	-.3516

ITERATION 3									
TIME	EL/DEC	JFMTS		AZ/HA		C1/C2/C3/R.		RANGE	
220821.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13125706 06 1	-.0605	.00000000 00 0	.0000
220831.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13122885 06 1	-.1543	.00000000 00 0	.0000
220841.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13120071 06 1	.2930	.00000000 00 0	.0000
220851.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13117264 06 1	.3555	.00000000 00 0	.0000
220901.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13114466 06 1	-.6563	.00000000 00 0	.0000
220911.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13111674 06 1	-.7422	.00000000 00 0	.0000
220921.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13108891 06 1	.0938	.00000000 00 0	.0000
220931.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13106114 06 1	.8564	.00000000 00 0	.0000
220941.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13103345 06 1	.5449	.00000000 00 0	.0000
220951.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13100584 06 1	.1582	.00000000 00 0	.0000
221001.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13097830 06 1	-.3037	.00000000 00 0	.0000
221011.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13095084 06 1	.1611	.00000000 00 0	.0000
221021.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13092345 06 1	-.4492	.00000000 00 0	.0000
221031.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13089613 06 1	-.1328	.00000000 00 0	.0000
221041.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13086889 06 1	-.8896	.00000000 00 0	.0000
221051.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13084172 06 1	.2793	.00000000 00 0	.0000
221101.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13081462 06 1	-.6250	.00000000 00 0	.0000
221111.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13078760 06 1	.3994	.00000000 00 0	.0000
221121.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13076065 06 1	-.6504	.00000000 00 0	.0000
221131.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13073377 06 1	-.7734	.00000000 00 0	.0000
221141.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13070697 06 1	1.0322	.00000000 00 0	.0000
221151.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13068023 06 1	-.2354	.00000000 00 0	.0000
221201.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13065357 06 1	.4258	.00000000 00 0	.0000
221211.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13062698 06 1	.0146	.00000000 00 0	.0000
221221.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13060047 06 1	.5332	.00000000 00 0	.0000
221231.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13057402 06 1	-.0205	.00000000 00 0	.0000
221241.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13054764 06 1	-.6455	.00000000 00 0	.0000
221251.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13052134 06 1	-.3418	.00000000 00 0	.0000
221301.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13049511 06 1	.8916	.00000000 00 0	.0000
221311.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13046895 06 1	-.9463	.00000000 00 0	.0000
221501.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13018575 06 1	-.7520	.00000000 00 0	.0000
221511.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13016042 06 1	-.4199	.00000000 00 0	.0000
221521.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13013515 06 1	.8447	.00000000 00 0	.0000
221531.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13010996 06 1	.0420	.00000000 00 0	.0000
221541.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13008483 06 1	-.8281	.00000000 00 0	.0000
221601.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13005976 06 1	.2354	.00000000 00 0	.0000
221611.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.13003477 06 1	.2314	.00000000 00 0	.0000
221621.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12998498 06 1	1.1602	.00000000 00 0	.0000
221631.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12996018 06 1	1.0234	.00000000 00 0	.0000
221641.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12993545 06 1	-.5498	.00000000 00 0	.0000
221651.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12991078 06 1	-.7842	.00000000 00 0	.0000
221701.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12988618 06 1	.8154	.00000000 00 0	.0000
221711.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12986165 06 1	.3486	.00000000 00 0	.0000
221721.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12983718 06 1	-.8174	.00000000 00 0	.0000
221731.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12981278 06 1	-.7793	.00000000 00 0	.0000
221741.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12978844 06 1	-.4404	.00000000 00 0	.0000
221751.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12976416 06 1	.8350	.00000000 00 0	.0000
221801.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12973996 06 1	.0449	.00000000 00 0	.0000
221811.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12971581 06 1	.1914	.00000000 00 0	.0000
221821.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12969173 06 1	-.7266	.00000000 00 0	.0000
221831.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12966771 06 1	.2930	.00000000 00 0	.0000
221841.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12964375 06 1	-.7529	.00000000 00 0	.0000
221851.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12961986 06 1	-.1396	.00000000 00 0	.0000
221901.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12959603 06 1	-1.0313	.00000000 00 0	.0000
221911.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12957226 06 1	-.2656	.00000000 00 0	.0000

JETMTS		ITERATION		3	
TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE	
221921.000	.00000000 00 0	.0000	.12954856 06 1	.4385	.00000000 00 0
221931.000	.00000000 00 0	.0000	.12952492 06 1	-.9199	.00000000 00 0
221941.000	.00000000 00 0	.0000	.12950134 06 1	.6592	.00000000 00 0
221951.000	.00000000 00 0	.0000	.12947782 06 1	.1768	.00000000 00 0
222001.000	.00000000 00 0	.0000	.12945437 06 1	-.3682	.00000000 00 0
222011.000	.00000000 00 0	.0000	.12943097 06 1	.0264	.00000000 00 0
222021.000	.00000000 00 0	.0000	.12940764 06 1	.3584	.00000000 00 0
222031.000	.00000000 00 0	.0000	.12938437 06 1	-.3691	.00000000 00 0
222041.000	.00000000 00 0	.0000	.12936116 06 1	-1.1592	.00000000 00 0
222051.000	.00000000 00 0	.0000	.12933801 06 1	-.0088	.00000000 00 0
222101.000	.00000000 00 0	.0000	.12931492 06 1	-.9189	.00000000 00 0
222111.000	.00000000 00 0	.0000	.12929189 06 1	-.8887	.00000000 00 0
222121.000	.00000000 00 0	.0000	.12926892 06 1	-.9189	.00000000 00 0
222131.000	.00000000 00 0	.0000	.12924601 06 1	-1.0098	.00000000 00 0
222141.000	.00000000 00 0	.0000	.12922316 06 1	-.1602	.00000000 00 0
222151.000	.00000000 00 0	.0000	.12920037 06 1	.6309	.00000000 00 0
222201.000	.00000000 00 0	.0000	.12917764 06 1	.3633	.00000000 00 0
222211.000	.00000000 00 0	.0000	.12915496 06 1	-.9648	.00000000 00 0
222221.000	.00000000 00 0	.0000	.12913235 06 1	-.3506	.00000000 00 0
222231.000	.00000000 00 0	.0000	.12910979 06 1	-.2051	.00000000 00 0
222241.000	.00000000 00 0	.0000	.12908730 06 1	-.2988	.00000000 00 0
222251.000	.00000000 00 0	.0000	.12906486 06 1	-.8613	.00000000 00 0
222301.000	.00000000 00 0	.0000	.12904248 06 1	.5205	.00000000 00 0
222311.000	.00000000 00 0	.0000	.12902016 06 1	.8438	.00000000 00 0
222321.000	.00000000 00 0	.0000	.12899789 06 1	1.1094	.00000000 00 0
222331.000	.00000000 00 0	.0000	.12897568 06 1	.3174	.00000000 00 0
222341.000	.00000000 00 0	.0000	.12895353 06 1	.4678	.00000000 00 0
222351.000	.00000000 00 0	.0000	.12893144 06 1	-.4385	.00000000 00 0
222401.000	.00000000 00 0	.0000	.12890940 06 1	-.4004	.00000000 00 0
222411.000	.00000000 00 0	.0000	.12888742 06 1	.5801	.00000000 00 0
222421.000	.00000000 00 0	.0000	.12886549 06 1	.5049	.00000000 00 0
222431.000	.00000000 00 0	.0000	.12884363 06 1	-.6270	.00000000 00 0
222441.000	.00000000 00 0	.0000	.12882181 06 1	.1846	.00000000 00 0
222451.000	.00000000 00 0	.0000	.12880006 06 1	-1.0596	.00000000 00 0
222501.000	.00000000 00 0	.0000	.12877836 06 1	.6416	.00000000 00 0
222511.000	.00000000 00 0	.0000	.12875671 06 1	.2871	.00000000 00 0
222521.000	.00000000 00 0	.0000	.12873512 06 1	-.1230	.00000000 00 0
222531.000	.00000000 00 0	.0000	.12871359 06 1	-.5859	.00000000 00 0
222541.000	.00000000 00 0	.0000	.12869211 06 1	-1.1055	.00000000 00 0
222551.000	.00000000 00 0	.0000	.12867068 06 1	.3203	.00000000 00 0
222601.000	.00000000 00 0	.0000	.12864931 06 1	-.3076	.00000000 00 0
222611.000	.00000000 00 0	.0000	.12862799 06 1	-.9902	.00000000 00 0
222621.000	.00000000 00 0	.0000	.12860673 06 1	.2734	.00000000 00 0
222631.000	.00000000 00 0	.0000	.12858552 06 1	.4824	.00000000 00 0
222641.000	.00000000 00 0	.0000	.12856436 06 1	.6406	.00000000 00 0
222651.000	.00000000 00 0	.0000	.12854326 06 1	.7422	.00000000 00 0
222701.000	.00000000 00 0	.0000	.12852221 06 1	.7920	.00000000 00 0
222711.000	.00000000 00 0	.0000	.12850121 06 1	-.2100	.00000000 00 0
222721.000	.00000000 00 0	.0000	.12848027 06 1	.7334	.00000000 00 0
222731.000	.00000000 00 0	.0000	.12845937 06 1	.6240	.00000000 00 0
222741.000	.00000000 00 0	.0000	.12843854 06 1	-.5371	.00000000 00 0
222751.000	.00000000 00 0	.0000	.12841775 06 1	.2490	.00000000 00 0
222801.000	.00000000 00 0	.0000	.12839702 06 1	-1.0166	.00000000 00 0
222811.000	.00000000 00 0	.0000	.12837633 06 1	-.3340	.00000000 00 0
222821.000	.00000000 00 0	.0000	.12835570 06 1	-.7041	.00000000 00 0
222831.000	.00000000 00 0	.0000	.12833512 06 1	-1.1240	.00000000 00 0

## ITERATION 3

## JETMTS

TIME	EL/DEC	AZ/HA	JETMTS	CI/C2/C3/R.	RANGE	
222841.000	.00000000 00 0	.00000000 00 0	.0000	.12831460 06 1	.4023	.00000000 00 0
222851.000	.00000000 00 0	.00000000 00 0	.0000	.12829412 06 1	-.1201	.00000000 00 0
222901.000	.00000000 00 0	.00000000 00 0	.0000	.12827369 06 1	-.6953	.00000000 00 0
222911.000	.00000000 00 0	.00000000 00 0	.0000	.12825332 06 1	-.3193	.00000000 00 0
222921.000	.00000000 00 0	.00000000 00 0	.0000	.12823299 06 1	1.0039	.00000000 00 0
222931.000	.00000000 00 0	.00000000 00 0	.0000	.12821272 06 1	.2764	.00000000 00 0
222941.000	.00000000 00 0	.00000000 00 0	.0000	.12819250 06 1	-.5000	.00000000 00 0
222951.000	.00000000 00 0	.00000000 00 0	.0000	.12817233 06 1	.6729	.00000000 00 0
223001.000	.00000000 00 0	.00000000 00 0	.0000	.12815220 06 1	-.2031	.00000000 00 0
223011.000	.00000000 00 0	.00000000 00 0	.0000	.12813213 06 1	-.1299	.00000000 00 0
223021.000	.00000000 00 0	.00000000 00 0	.0000	.12811210 06 1	-1.1055	.00000000 00 0
223031.000	.00000000 00 0	.00000000 00 0	.0000	.12809213 06 1	-.1318	.00000000 00 0
223041.000	.00000000 00 0	.00000000 00 0	.0000	.12807221 06 1	.7939	.00000000 00 0
223051.000	.00000000 00 0	.00000000 00 0	.0000	.12805233 06 1	.6689	.00000000 00 0
223101.000	.00000000 00 0	.00000000 00 0	.0000	.12803250 06 1	.4980	.00000000 00 0
223111.000	.00000000 00 0	.00000000 00 0	.0000	.12801272 06 1	.2754	.00000000 00 0
223121.000	.00000000 00 0	.00000000 00 0	.0000	.12799299 06 1	1.0068	.00000000 00 0
223131.000	.00000000 00 0	.00000000 00 0	.0000	.12797331 06 1	.6875	.00000000 00 0
223141.000	.00000000 00 0	.00000000 00 0	.0000	.12795368 06 1	-.6787	.00000000 00 0
223151.000	.00000000 00 0	.00000000 00 0	.0000	.12793409 06 1	-.0928	.00000000 00 0
223201.000	.00000000 00 0	.00000000 00 0	.0000	.12791456 06 1	-.5557	.00000000 00 0
223211.000	.00000000 00 0	.00000000 00 0	.0000	.12789506 06 1	-.0654	.00000000 00 0
223221.000	.00000000 00 0	.00000000 00 0	.0000	.12787562 06 1	.3770	.00000000 00 0
223231.000	.00000000 00 0	.00000000 00 0	.0000	.12785623 06 1	-1.2275	.00000000 00 0
223241.000	.00000000 00 0	.00000000 00 0	.0000	.12783688 06 1	1.1211	.00000000 00 0
223251.000	.00000000 00 0	.00000000 00 0	.0000	.12781758 06 1	1.4219	.00000000 00 0
223301.000	.00000000 00 0	.00000000 00 0	.0000	.12779832 06 1	.6758	.00000000 00 0
223311.000	.00000000 00 0	.00000000 00 0	.0000	.12777912 06 1	-1.1172	.00000000 00 0
223321.000	.00000000 00 0	.00000000 00 0	.0000	.12775996 06 1	1.0439	.00000000 00 0
223331.000	.00000000 00 0	.00000000 00 0	.0000	.12774084 06 1	.1582	.00000000 00 0
223341.000	.00000000 00 0	.00000000 00 0	.0000	.12772177 06 1	1.2266	.00000000 00 0
223351.000	.00000000 00 0	.00000000 00 0	.0000	.12770275 06 1	-.7510	.00000000 00 0
223401.000	.00000000 00 0	.00000000 00 0	.0000	.12768377 06 1	.2256	.00000000 00 0
223411.000	.00000000 00 0	.00000000 00 0	.0000	.12766484 06 1	-.8438	.00000000 00 0
223421.000	.00000000 00 0	.00000000 00 0	.0000	.12764596 06 1	.0410	.00000000 00 0
223431.000	.00000000 00 0	.00000000 00 0	.0000	.12762712 06 1	-.1191	.00000000 00 0
223441.000	.00000000 00 0	.00000000 00 0	.0000	.12760832 06 1	.6758	.00000000 00 0
223451.000	.00000000 00 0	.00000000 00 0	.0000	.12758957 06 1	.4258	.00000000 00 0
223501.000	.00000000 00 0	.00000000 00 0	.0000	.12757087 06 1	.1309	.00000000 00 0
223511.000	.00000000 00 0	.00000000 00 0	.0000	.12755221 06 1	-.2100	.00000000 00 0
223521.000	.00000000 00 0	.00000000 00 0	.0000	.12753359 06 1	.4053	.00000000 00 0
223531.000	.00000000 00 0	.00000000 00 0	.0000	.12751502 06 1	-.0244	.00000000 00 0
223541.000	.00000000 00 0	.00000000 00 0	.0000	.12749650 06 1	-.4971	.00000000 00 0
223551.000	.00000000 00 0	.00000000 00 0	.0000	.12747802 06 1	-1.0156	.00000000 00 0
223601.000	.00000000 00 0	.00000000 00 0	.0000	.12745958 06 1	.4229	.00000000 00 0
223611.000	.00000000 00 0	.00000000 00 0	.0000	.12744118 06 1	-.1826	.00000000 00 0
223621.000	.00000000 00 0	.00000000 00 0	.0000	.12742283 06 1	.1680	.00000000 00 0
223631.000	.00000000 00 0	.00000000 00 0	.0000	.12740452 06 1	-.5234	.00000000 00 0
223641.000	.00000000 00 0	.00000000 00 0	.0000	.12738626 06 1	.7402	.00000000 00 0
223651.000	.00000000 00 0	.00000000 00 0	.0000	.12736804 06 1	-1.0391	.00000000 00 0
223701.000	.00000000 00 0	.00000000 00 0	.0000	.12734986 06 1	-.8613	.00000000 00 0
223711.000	.00000000 00 0	.00000000 00 0	.0000	.12733173 06 1	.2734	.00000000 00 0
223721.000	.00000000 00 0	.00000000 00 0	.0000	.12731363 06 1	-.6368	.00000000 00 0
223731.000	.00000000 00 0	.00000000 00 0	.0000	.12729558 06 1	-.5850	.00000000 00 0
223741.000	.00000000 00 0	.00000000 00 0	.0000	.12727758 06 1	-.5771	.00000000 00 0
223751.000	.00000000 00 0	.00000000 00 0	.0000	.12725961 06 1	.3867	.00000000 00 0



## ITERATION 3

## JETMTS

TIME	EL/DEC	AZ/HA	CL/C2/C3/R*	RANGE	
223801.000	.00000000 00 0	.00000000 00 0	.12724169 06 1	-.6914	.0000
223811.000	.00000000 00 0	.00000000 00 0	.12722238 06 1	-.8096	.0000
223821.000	.00000000 00 0	.00000000 00 0	.12720597 06 1	-.9727	.0000
223831.000	.00000000 00 0	.00000000 00 0	.12718817 06 1	.8252	.0000
223841.000	.00000000 00 0	.00000000 00 0	.12717042 06 1	.5801	.0000
223851.000	.00000000 00 0	.00000000 00 0	.12715271 06 1	.2930	.0000
223901.000	.00000000 00 0	.00000000 00 0	.12713503 06 1	-1.0342	.0000
223911.000	.00000000 00 0	.00000000 00 0	.12711740 06 1	-.4033	.0000
223921.000	.00000000 00 0	.00000000 00 0	.12709981 06 1	.1875	.0000
223931.000	.00000000 00 0	.00000000 00 0	.12708226 06 1	-.2637	.0000
223941.000	.00000000 00 0	.00000000 00 0	.12706475 06 1	1.2451	.0000
223951.000	.00000000 00 0	.00000000 00 0	.12704729 06 1	-.2871	.0000
224001.000	.00000000 00 0	.00000000 00 0	.12702986 06 1	.1406	.0000
224011.000	.00000000 00 0	.00000000 00 0	.12701247 06 1	-.4727	.0000
224021.000	.00000000 00 0	.00000000 00 0	.12699513 06 1	.8740	.0000
224031.000	.00000000 00 0	.00000000 00 0	.12697782 06 1	.1807	.0000
224041.000	.00000000 00 0	.00000000 00 0	.12696055 06 1	-.5527	.0000
224051.000	.00000000 00 0	.00000000 00 0	.12694333 06 1	-.3262	.0000
224101.000	.00000000 00 0	.00000000 00 0	.12692614 06 1	-.1377	.0000
224111.000	.00000000 00 0	.00000000 00 0	.12690899 06 1	-.9902	.0000
224121.000	.00000000 00 0	.00000000 00 0	.12689188 06 1	.1191	.0000
224131.000	.00000000 00 0	.00000000 00 0	.12687481 06 1	.1885	.0000
224141.000	.00000000 00 0	.00000000 00 0	.12685778 06 1	-.7822	.0000
224151.000	.00000000 00 0	.00000000 00 0	.12684079 06 1	-.7910	.0000
224201.000	.00000000 00 0	.00000000 00 0	.12682384 06 1	-.8379	.0000
224211.000	.00000000 00 0	.00000000 00 0	.12680692 06 1	1.0752	.0000
224221.000	.00000000 00 0	.00000000 00 0	.12679005 06 1	.9502	.0000
224231.000	.00000000 00 0	.00000000 00 0	.12677321 06 1	-.2139	.0000
224241.000	.00000000 00 0	.00000000 00 0	.12675641 06 1	-.4160	.0000
224251.000	.00000000 00 0	.00000000 00 0	.12673965 06 1	.3447	.0000
224301.000	.00000000 00 0	.00000000 00 0	.12672293 06 1	.0664	.0000
224311.000	.00000000 00 0	.00000000 00 0	.12670625 06 1	-.2490	.0000
224321.000	.00000000 00 0	.00000000 00 0	.12668960 06 1	.3965	.0000
224331.000	.00000000 00 0	.00000000 00 0	.12667299 06 1	-.9941	.0000
224341.000	.00000000 00 0	.00000000 00 0	.12665642 06 1	.5762	.0000
224351.000	.00000000 00 0	.00000000 00 0	.12663989 06 1	1.1094	.0000
224401.000	.00000000 00 0	.00000000 00 0	.12662339 06 1	-.3945	.0000
224411.000	.00000000 00 0	.00000000 00 0	.12660694 06 1	-.9355	.0000
224421.000	.00000000 00 0	.00000000 00 0	.12659051 06 1	.4863	.0000
224431.000	.00000000 00 0	.00000000 00 0	.12657413 06 1	-.1289	.0000
224441.000	.00000000 00 0	.00000000 00 0	.12655778 06 1	.2188	.0000
224451.000	.00000000 00 0	.00000000 00 0	.12654147 06 1	-.4697	.0000
224501.000	.00000000 00 0	.00000000 00 0	.12652519 06 1	-1.1934	.0000
224511.000	.00000000 00 0	.00000000 00 0	.12650896 06 1	.0439	.0000
224521.000	.00000000 00 0	.00000000 00 0	.12649275 06 1	-.7529	.0000
224531.000	.00000000 00 0	.00000000 00 0	.12647659 06 1	.4121	.0000
224541.000	.00000000 00 0	.00000000 00 0	.12646046 06 1	-.4580	.0000
224551.000	.00000000 00 0	.00000000 00 0	.12644436 06 1	-.3643	.0000
224601.000	.00000000 00 0	.00000000 00 0	.12642831 06 1	-.3066	.0000
224611.000	.00000000 00 0	.00000000 00 0	.12641228 06 1	-.2842	.0000
224621.000	.00000000 00 0	.00000000 00 0	.12639630 06 1	-1.2969	.0000
224631.000	.00000000 00 0	.00000000 00 0	.12638035 06 1	-.3467	.0000
224641.000	.00000000 00 0	.00000000 00 0	.12636443 06 1	-.4316	.0000
224651.000	.00000000 00 0	.00000000 00 0	.12634855 06 1	-.5508	.0000
224701.000	.00000000 00 0	.00000000 00 0	.12633270 06 1	-.7051	.0000
224711.000	.00000000 00 0	.00000000 00 0	.12631689 06 1	-.8945	.0000



## ITERATION 3

TIME	EL/DEC	JETMS	AZ/HA	CI/C2/C3/R.	RANGE
224721.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12630112 06 1	-1.1191
224731.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12628538 06 1	-.3789
224741.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12626967 06 1	-.3271
224751.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12625400 06 1	-.0020
224801.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12623836 06 1	-.6348
224811.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12622276 06 1	-.2373
224821.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12620719 06 1	-1.1943
224831.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12619166 06 1	-.6611
224841.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12617616 06 1	-1.1602
224851.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12616069 06 1	1.3047
224901.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12614526 06 1	-.7373
224911.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12612986 06 1	-.1367
224921.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12611450 06 1	-.5020
224931.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12609917 06 1	-.1670
224941.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12608387 06 1	-.1318
224951.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12606860 06 1	-.3965
225001.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12605337 06 1	-.6289
225011.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12603817 06 1	-.8262
225021.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12602301 06 1	-.9922
225031.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12600787 06 1	-.8740
225041.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12599277 06 1	-.2266
225051.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12597771 06 1	-.2939
225101.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12596267 06 1	1.3301
225111.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12594767 06 1	1.3330
225121.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12593270 06 1	1.3027
225131.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12591776 06 1	-.7588
225141.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12590285 06 1	-.8525
225151.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12588798 06 1	-.0215
225201.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12587314 06 1	-.1357
225211.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12585832 06 1	-.3252
225221.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12584355 06 1	-.5469
225231.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12582880 06 1	-.2012
225241.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12581408 06 1	-.0830
225251.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12579940 06 1	-.3994
225301.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12578475 06 1	-.7461
225311.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12577012 06 1	-.1240
225321.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12575553 06 1	-.5342
225331.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12574097 06 1	-.0264
225341.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12572644 06 1	-.5547
225401.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12569748 06 1	-.4795
225411.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12568304 06 1	-.9570
225421.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12566863 06 1	-.3643
225431.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12565426 06 1	-.7393
225441.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12563991 06 1	-.0859
225451.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12562560 06 1	-.5996
225501.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12561131 06 1	-1.3145
225511.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12559706 06 1	-.0586
225531.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12558264 06 1	-.3613
225541.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12556847 06 1	-.5264
225551.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12555403 06 1	-.3369
225601.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12552623 06 1	-.2305
225611.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12551215 06 1	-.1543
225621.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12549811 06 1	-1.1064
225631.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12548409 06 1	-.0879
225641.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12547010 06 1	-1.0996
225651.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.12545614 06 1	-.8604

## ITERATION 3

## JETMIS

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE	
225701.000	.00000000 00 0	.00000000 00 0	.12544221 06 1	.7920	.00000000 00 0
225711.000	.00000000 00 0	.00000000 00 0	.12542831 06 1	-.3066	.00000000 00 0
225721.000	.00000000 00 0	.00000000 00 0	.12541443 06 1	-.4336	.00000000 00 0
225731.000	.00000000 00 0	.00000000 00 0	.12540059 06 1	-.5879	.00000000 00 0
225741.000	.00000000 00 0	.00000000 00 0	.12538677 06 1	-.7734	.00000000 00 0
225751.000	.00000000 00 0	.00000000 00 0	.12537298 06 1	.0137	.00000000 00 0
225801.000	.00000000 00 0	.00000000 00 0	.12535923 06 1	.7725	.00000000 00 0
225811.000	.00000000 00 0	.00000000 00 0	.12534550 06 1	.5029	.00000000 00 0
225821.000	.00000000 00 0	.00000000 00 0	.12533180 06 1	.2041	.00000000 00 0
225831.000	.00000000 00 0	.00000000 00 0	.12531812 06 1	-.1211	.00000000 00 0
225841.000	.00000000 00 0	.00000000 00 0	.12530448 06 1	.5244	.00000000 00 0
225851.000	.00000000 00 0	.00000000 00 0	.12529086 06 1	.1416	.00000000 00 0
225901.000	.00000000 00 0	.00000000 00 0	.12527727 06 1	-.2695	.00000000 00 0
225911.000	.00000000 00 0	.00000000 00 0	.12526371 06 1	.2910	.00000000 00 0
225921.000	.00000000 00 0	.00000000 00 0	.12525017 06 1	-.1738	.00000000 00 0
225931.000	.00000000 00 0	.00000000 00 0	.12523667 06 1	.3320	.00000000 00 0
225941.000	.00000000 00 0	.00000000 00 0	.12522319 06 1	.8096	.00000000 00 0
225951.000	.00000000 00 0	.00000000 00 0	.12520974 06 1	.2607	.00000000 00 0
230001.000	.00000000 00 0	.00000000 00 0	.12519632 06 1	.6846	.00000000 00 0
230011.000	.00000000 00 0	.00000000 00 0	.12518292 06 1	.0801	.00000000 00 0
230021.000	.00000000 00 0	.00000000 00 0	.12516955 06 1	-.5508	.00000000 00 0
230031.000	.00000000 00 0	.00000000 00 0	.12515621 06 1	.7900	.00000000 00 0
230041.000	.00000000 00 0	.00000000 00 0	.12514289 06 1	.1055	.00000000 00 0
230051.000	.00000000 00 0	.00000000 00 0	.12512961 06 1	-.6074	.00000000 00 0
230101.000	.00000000 00 0	.00000000 00 0	.12511635 06 1	.6523	.00000000 00 0
230111.000	.00000000 00 0	.00000000 00 0	.12510311 06 1	-.1143	.00000000 00 0
230121.000	.00000000 00 0	.00000000 00 0	.12508991 06 1	.0918	.00000000 00 0
230131.000	.00000000 00 0	.00000000 00 0	.12507673 06 1	-.7285	.00000000 00 0
230141.000	.00000000 00 0	.00000000 00 0	.12506357 06 1	-.5752	.00000000 00 0
230151.000	.00000000 00 0	.00000000 00 0	.12505045 06 1	.5518	.00000000 00 0
230201.000	.00000000 00 0	.00000000 00 0	.12503735 06 1	-.3486	.00000000 00 0
230211.000	.00000000 00 0	.00000000 00 0	.12502427 06 1	-.2744	.00000000 00 0
230221.000	.00000000 00 0	.00000000 00 0	.12501123 06 1	-.2266	.00000000 00 0
230231.000	.00000000 00 0	.00000000 00 0	.12499821 06 1	.7939	.00000000 00 0
230241.000	.00000000 00 0	.00000000 00 0	.12498521 06 1	-.2109	.00000000 00 0
230251.000	.00000000 00 0	.00000000 00 0	.12497224 06 1	.7578	.00000000 00 0
230301.000	.00000000 00 0	.00000000 00 0	.12495930 06 1	-.2998	.00000000 00 0
230311.000	.00000000 00 0	.00000000 00 0	.12494638 06 1	.6162	.00000000 00 0
230321.000	.00000000 00 0	.00000000 00 0	.12493349 06 1	-.4922	.00000000 00 0
230331.000	.00000000 00 0	.00000000 00 0	.12492063 06 1	-.6279	.00000000 00 0
230341.000	.00000000 00 0	.00000000 00 0	.12490779 06 1	.2129	.00000000 00 0
230351.000	.00000000 00 0	.00000000 00 0	.12489497 06 1	.0264	.00000000 00 0
230401.000	.00000000 00 0	.00000000 00 0	.12488219 06 1	.8145	.00000000 00 0
230411.000	.00000000 00 0	.00000000 00 0	.12486942 06 1	.5771	.00000000 00 0
230421.000	.00000000 00 0	.00000000 00 0	.12485669 06 1	.3135	.00000000 00 0
230431.000	.00000000 00 0	.00000000 00 0	.12484397 06 1	.0264	.00000000 00 0
230441.000	.00000000 00 0	.00000000 00 0	.12483129 06 1	-.2871	.00000000 00 0
230451.000	.00000000 00 0	.00000000 00 0	.12481862 06 1	-.6260	.00000000 00 0
234011.000	.00000000 00 0	.00000000 00 0	.12260567 06 1	1.3271	.00000000 00 0
234021.000	.00000000 00 0	.00000000 00 0	.12259708 06 1	-.0791	.00000000 00 0
234031.000	.00000000 00 0	.00000000 00 0	.12258850 06 1	1.4990	.00000000 00 0
234041.000	.00000000 00 0	.00000000 00 0	.12257994 06 1	.0625	.00000000 00 0
234051.000	.00000000 00 0	.00000000 00 0	.12257139 06 1	-.3867	.00000000 00 0
234101.000	.00000000 00 0	.00000000 00 0	.12256285 06 1	.1484	.00000000 00 0
234111.000	.00000000 00 0	.00000000 00 0	.12255433 06 1	-.3301	.00000000 00 0
234121.000	.00000000 00 0	.00000000 00 0	.12254582 06 1	-.8242	.00000000 00 0

## JLTMITS

## JLTMITS

## JLTMITS

TIME	EL/DEC	AZ/HA	CL/C2/C3/R.	RANGE	
234131.000	.00000000 00 0	.00000000 00 0	.1253733 06 1	.6889	.00000000 00 0
234141.000	.00000000 00 0	.00000000 00 0	.1252885 06 1	.1475	.00000000 00 0
234151.000	.00000000 00 0	.00000000 00 0	.1252039 06 1	-.3877	.00000000 00 0
234201.000	.00000000 00 0	.00000000 00 0	.1251194 06 1	.0625	.00000000 00 0
234211.000	.00000000 00 0	.00000000 00 0	.1250350 06 1	-.5020	.00000000 00 0
234221.000	.00000000 00 0	.00000000 00 0	.1249508 06 1	.9199	.00000000 00 0
234231.000	.00000000 00 0	.00000000 00 0	.1248667 06 1	1.3281	.00000000 00 0
234241.000	.00000000 00 0	.00000000 00 0	.1247828 06 1	-.2773	.00000000 00 0
234251.000	.00000000 00 0	.00000000 00 0	.1246990 06 1	-.8975	.00000000 00 0
234301.000	.00000000 00 0	.00000000 00 0	.1246153 06 1	.4688	.00000000 00 0
234311.000	.00000000 00 0	.00000000 00 0	.1245318 06 1	-1.1787	.00000000 00 0
234321.000	.00000000 00 0	.00000000 00 0	.1244484 06 1	.1592	.00000000 00 0
234331.000	.00000000 00 0	.00000000 00 0	.1243652 06 1	.4834	.00000000 00 0
234341.000	.00000000 00 0	.00000000 00 0	.1242820 06 1	-1.2051	.00000000 00 0
234351.000	.00000000 00 0	.00000000 00 0	.1241991 06 1	.0918	.00000000 00 0
234401.000	.00000000 00 0	.00000000 00 0	.1241162 06 1	.3750	.00000000 00 0
234411.000	.00000000 00 0	.00000000 00 0	.1240335 06 1	.6445	.00000000 00 0
234421.000	.00000000 00 0	.00000000 00 0	.1239510 06 1	-1.0996	.00000000 00 0
234431.000	.00000000 00 0	.00000000 00 0	.1238686 06 1	.1426	.00000000 00 0
234441.000	.00000000 00 0	.00000000 00 0	.1237863 06 1	.3711	.00000000 00 0
234451.000	.00000000 00 0	.00000000 00 0	.1237041 06 1	.5869	.00000000 00 0
234501.000	.00000000 00 0	.00000000 00 0	.1236221 06 1	.7881	.00000000 00 0
234511.000	.00000000 00 0	.00000000 00 0	.1235402 06 1	-.0234	.00000000 00 0
234521.000	.00000000 00 0	.00000000 00 0	.1234585 06 1	-.8496	.00000000 00 0
234531.000	.00000000 00 0	.00000000 00 0	.1233769 06 1	.3115	.00000000 00 0
234541.000	.00000000 00 0	.00000000 00 0	.1232954 06 1	.4590	.00000000 00 0
234551.000	.00000000 00 0	.00000000 00 0	.1232141 06 1	-.4072	.00000000 00 0
234601.000	.00000000 00 0	.00000000 00 0	.1231328 06 1	.7139	.00000000 00 0
234611.000	.00000000 00 0	.00000000 00 0	.1230518 06 1	-.1787	.00000000 00 0
234621.000	.00000000 00 0	.00000000 00 0	.1229708 06 1	-.0850	.00000000 00 0
234631.000	.00000000 00 0	.00000000 00 0	.1228900 06 1	-1.0029	.00000000 00 0
234641.000	.00000000 00 0	.00000000 00 0	.1228094 06 1	.0635	.00000000 00 0
234651.000	.00000000 00 0	.00000000 00 0	.1227288 06 1	-.8809	.00000000 00 0
234701.000	.00000000 00 0	.00000000 00 0	.1226484 06 1	-.8408	.00000000 00 0
234711.000	.00000000 00 0	.00000000 00 0	.1225681 06 1	.1865	.00000000 00 0
234721.000	.00000000 00 0	.00000000 00 0	.1224880 06 1	.2021	.00000000 00 0
234731.000	.00000000 00 0	.00000000 00 0	.1224080 06 1	.2041	.00000000 00 0
234741.000	.00000000 00 0	.00000000 00 0	.1223281 06 1	1.1934	.00000000 00 0
234751.000	.00000000 00 0	.00000000 00 0	.1222483 06 1	.1689	.00000000 00 0
234801.000	.00000000 00 0	.00000000 00 0	.1221687 06 1	1.1309	.00000000 00 0
234811.000	.00000000 00 0	.00000000 00 0	.1220892 06 1	.0811	.00000000 00 0
234821.000	.00000000 00 0	.00000000 00 0	.1220098 06 1	-.9824	.00000000 00 0
234831.000	.00000000 00 0	.00000000 00 0	.1219306 06 1	.9414	.00000000 00 0
234841.000	.00000000 00 0	.00000000 00 0	.1218515 06 1	-.1475	.00000000 00 0
234851.000	.00000000 00 0	.00000000 00 0	.1217725 06 1	-.2500	.00000000 00 0
234901.000	.00000000 00 0	.00000000 00 0	.1216936 06 1	.6348	.00000000 00 0
234911.000	.00000000 00 0	.00000000 00 0	.1216149 06 1	-.4922	.00000000 00 0
234921.000	.00000000 00 0	.00000000 00 0	.1215363 06 1	.3672	.00000000 00 0
234931.000	.00000000 00 0	.00000000 00 0	.1214579 06 1	.2139	.00000000 00 0
234941.000	.00000000 00 0	.00000000 00 0	.1213795 06 1	.0479	.00000000 00 0
234951.000	.00000000 00 0	.00000000 00 0	.1213013 06 1	-.1309	.00000000 00 0
235001.000	.00000000 00 0	.00000000 00 0	.1212232 06 1	-.3223	.00000000 00 0
235011.000	.00000000 00 0	.00000000 00 0	.1211453 06 1	-.5264	.00000000 00 0
235021.000	.00000000 00 0	.00000000 00 0	.1210674 06 1	.2568	.00000000 00 0
235031.000	.00000000 00 0	.00000000 00 0	.1209897 06 1	1.0273	.00000000 00 0
235041.000	.00000000 00 0	.00000000 00 0	.1209121 06 1	.7861	.00000000 00 0

TIME	EL/DEC	JETMIS		ITERATION	C1/C2/C3/R.	RANGE	
235051.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12208347 06 1	.5313	.00000000 00 0
235101.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12207574 06 1	-.7354	.00000000 00 0
235111.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12206801 06 1	-.0146	.00000000 00 0
235121.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12206031 06 1	.6934	.00000000 00 0
235131.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12205261 06 1	-.6104	.00000000 00 0
235141.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12204493 06 1	-.9277	.00000000 00 0
235151.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12203726 06 1	-1.2559	.00000000 00 0
235201.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12202960 06 1	-.5977	.00000000 00 0
235211.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12202195 06 1	-.9512	.00000000 00 0
235221.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12201432 06 1	-.3174	.00000000 00 0
235231.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12200669 06 1	.3047	.00000000 00 0
235241.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12199908 06 1	.9141	.00000000 00 0
235251.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12199149 06 1	-.4883	.00000000 00 0
235301.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12198390 06 1	.0967	.00000000 00 0
235311.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12197633 06 1	-.3311	.00000000 00 0
235321.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12196877 06 1	.2305	.00000000 00 0
235331.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12196122 06 1	.7783	.00000000 00 0
235341.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12195368 06 1	-.6846	.00000000 00 0
235351.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12194616 06 1	-1.1602	.00000000 00 0
235401.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12193865 06 1	-.6475	.00000000 00 0
235411.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12193115 06 1	-.1475	.00000000 00 0
235421.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12192366 06 1	-.6592	.00000000 00 0
235431.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12191618 06 1	-.1826	.00000000 00 0
235441.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12190872 06 1	.2832	.00000000 00 0
235451.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12190126 06 1	-.2656	.00000000 00 0
235501.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12189382 06 1	.1758	.00000000 00 0
235511.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12188639 06 1	-1.3945	.00000000 00 0
235521.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12187898 06 1	1.0225	.00000000 00 0
235531.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12187157 06 1	.4268	.00000000 00 0
235541.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12186418 06 1	.8203	.00000000 00 0
235551.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12185680 06 1	.2031	.00000000 00 0
235601.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12184943 06 1	.5732	.00000000 00 0
235611.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12184207 06 1	-1.0693	.00000000 00 0
235621.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12183472 06 1	-.2783	.00000000 00 0
235631.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12182739 06 1	-1.3877	.00000000 00 0
235641.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12182006 06 1	.9355	.00000000 00 0
235711.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12179816 06 1	.8369	.00000000 00 0
235721.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12179088 06 1	.1143	.00000000 00 0
235731.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12178362 06 1	.3799	.00000000 00 0
235741.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12177637 06 1	-.3672	.00000000 00 0
235751.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12176912 06 1	-.1240	.00000000 00 0
235801.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12176189 06 1	1.1074	.00000000 00 0
235811.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12175467 06 1	.3271	.00000000 00 0
235821.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12174746 06 1	.5352	.00000000 00 0
235831.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12174027 06 1	-.2676	.00000000 00 0
235841.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12173308 06 1	.9180	.00000000 00 0
235851.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12172591 06 1	.0928	.00000000 00 0
235901.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12172591 06 1	-.2559	.00000000 00 0
235911.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12171874 06 1	-.5918	.00000000 00 0
235921.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12171045 06 1	.5488	.00000000 00 0
235931.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12169732 06 1	.6787	.00000000 00 0
235941.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12169020 06 1	.7959	.00000000 00 0
235951.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12168310 06 1	-1.0967	.00000000 00 0
000001.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12167600 06 1	-.0020	.00000000 00 0
000011.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12166892 06 1	.0830	.00000000 00 0
000021.000	.00000000 00 0	.00000000 00 0	.00000000 00 0	.0000	.12166184 06 1	-.8438	.00000000 00 0

TIME	EL/DEC	AZ/HA	JETMIS	ITERATION		C1/C2/C3/R.	RANGE		
				3	3				
000031.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12165478 06 1	.2188	.00000000 00 0	.0000	.0000
000041.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12164773 06 1	.2705	.00000000 00 0	.0000	.0000
000051.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12164069 06 1	.3105	.00000000 00 0	.0000	.0000
000101.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12163366 06 1	.3398	.00000000 00 0	.0000	.0000
000111.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12162664 06 1	-.6416	.00000000 00 0	.0000	.0000
000121.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12161963 06 1	.3662	.00000000 00 0	.0000	.0000
000131.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12161264 06 1	.3623	.00000000 00 0	.0000	.0000
000141.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12160565 06 1	.3477	.00000000 00 0	.0000	.0000
000151.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12159868 06 1	.3232	.00000000 00 0	.0000	.0000
000201.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12159171 06 1	-.7129	.00000000 00 0	.0000	.0000
000211.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12158476 06 1	-.7607	.00000000 00 0	.0000	.0000
000221.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12157782 06 1	-.8184	.00000000 00 0	.0000	.0000
000231.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12157089 06 1	.1133	.00000000 00 0	.0000	.0000
000241.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12156397 06 1	.0332	.00000000 00 0	.0000	.0000
000251.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12155706 06 1	-.0566	.00000000 00 0	.0000	.0000
000301.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12155016 06 1	-.1582	.00000000 00 0	.0000	.0000
000311.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12154327 06 1	-1.2895	.00000000 00 0	.0000	.0000
000321.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12153639 06 1	.6084	.00000000 00 0	.0000	.0000
000331.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12152952 06 1	.4746	.00000000 00 0	.0000	.0000
000341.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12152267 06 1	-.6699	.00000000 00 0	.0000	.0000
000351.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12151582 06 1	-.8242	.00000000 00 0	.0000	.0000
000401.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12150899 06 1	.0117	.00000000 00 0	.0000	.0000
000411.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12150216 06 1	.8350	.00000000 00 0	.0000	.0000
000421.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12149535 06 1	-.3496	.00000000 00 0	.0000	.0000
000431.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12148855 06 1	-.5479	.00000000 00 0	.0000	.0000
000441.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12148175 06 1	-.7539	.00000000 00 0	.0000	.0000
000451.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12147497 06 1	1.0273	.00000000 00 0	.0000	.0000
000501.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12146820 06 1	-.2012	.00000000 00 0	.0000	.0000
000511.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12146144 06 1	.5605	.00000000 00 0	.0000	.0000
000521.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12145469 06 1	.3115	.00000000 00 0	.0000	.0000
000531.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12144795 06 1	1.0518	.00000000 00 0	.0000	.0000
000541.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12144122 06 1	.7822	.00000000 00 0	.0000	.0000
000551.000	.00000000 00 0	.00000000 00 0	.0000	.0000	.12143450 06 1	.5010	.00000000 00 0	.0000	.0000

TIME	EL/DEC	CCMJET	ITERATION	3	CM/C2/C3/R.	RANGE	
224651.000	.33496599 03 1	AZ/HA			.0068	.00000000 00 0	.0000
224751.000	.33494477 03 1				-.0158	.00000000 00 0	.0000
224851.000	.33492464 03 1				-.0132	.00000000 00 0	.0000
224951.000	.33490556 03 1				-.0104	.00000000 00 0	.0000
225051.000	.33488751 03 1				-.0085	.00000000 00 0	.0000
225151.000	.33487043 03 1				-.0076	.00000000 00 0	.0000
225351.000	.33485906 03 1				-.0032	.00000000 00 0	.0000
225451.000	.33482470 03 1				-.0050	.00000000 00 0	.0000
225551.000	.33481118 03 1				-.0076	.00000000 00 0	.0000
225751.000	.33478655 03 1				-.0070	.00000000 00 0	.0000
225851.000	.33477537 03 1				-.0061	.00000000 00 0	.0000
230151.000	.33474611 03 1				-.0054	.00000000 00 0	.0000
230251.000	.33473769 03 1				-.0062	.00000000 00 0	.0000
230351.000	.33472989 03 1				-.0028	.00000000 00 0	.0000
230451.000	.33472270 03 1				-.0046	.00000000 00 0	.0000
230551.000	.33469513 03 1				-.0043	.00000000 00 0	.0000
231451.000	.33467983 03 1				-.0018	.00000000 00 0	.0000
231551.000	.33467807 03 1				-.0004	.00000000 00 0	.0000
231651.000	.33467670 03 1				-.0047	.00000000 00 0	.0000
231751.000	.33467572 03 1				-.0002	.00000000 00 0	.0000
231951.000	.33467485 03 1				-.0001	.00000000 00 0	.0000
232051.000	.33467494 03 1				-.0010	.00000000 00 0	.0000
232151.000	.33467537 03 1				-.0004	.00000000 00 0	.0000
232251.000	.33467612 03 1				-.0020	.00000000 00 0	.0000
232351.000	.33467719 03 1				-.0032	.00000000 00 0	.0000
232451.000	.33467856 03 1				-.0028	.00000000 00 0	.0000
232851.000	.33466685 03 1				-.0002	.00000000 00 0	.0000
233051.000	.33465258 03 1				-.0032	.00000000 00 0	.0000
233151.000	.33470293 03 1				-.0080	.00000000 00 0	.0000
233351.000	.33470683 03 1				-.0003	.00000000 00 0	.0000
233551.000	.33471093 03 1				-.0076	.00000000 00 0	.0000
234151.000	.33473957 03 1				-.0009	.00000000 00 0	.0000

## ITERATION 3

## JOBJET

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE
211706.000	.10673634 02 1	.48545422 02 1	.00000000 00 0	.00000000 00 0
211716.000	.99733828 01 1	.47361320 02 1	.00000000 00 0	.00000000 00 0
211726.000	.92689663 01 1	.46181824 02 1	.00000000 00 0	.00000000 00 0
211736.000	.85613278 01 1	.45007583 02 1	.00000000 00 0	.00000000 00 0
211746.000	.78514261 01 1	.43839293 02 1	.00000000 00 0	.00000000 00 0
211756.000	.71402171 01 1	.42677588 02 1	.00000000 00 0	.00000000 00 0
211806.000	.64286629 01 1	.41523088 02 1	.00000000 00 0	.00000000 00 0
211816.000	.57177053 01 1	.40376411 02 1	.00000000 00 0	.00000000 00 0
211906.000	.00000000 00 0	.34779767 02 1	.00000000 00 0	.00000000 00 0
211916.000	.15149566 01 1	.33691299 02 1	.00000000 00 0	.00000000 00 0
211936.000	.15778526 00 1	.31548669 02 1	.00000000 00 0	.00000000 00 0
211946.000	.35950137 03 1	.30483803 02 1	.00000000 00 0	.00000000 00 0
211956.000	.35884228 03 1	.29443260 02 1	.00000000 00 0	.00000000 00 0
212006.000	.35819220 03 1	.28415333 02 1	.00000000 00 0	.00000000 00 0
212016.000	.35755162 03 1	.27400261 02 1	.00000000 00 0	.00000000 00 0
212026.000	.35692099 03 1	.26398288 02 1	.00000000 00 0	.00000000 00 0
212036.000	.35630070 03 1	.25409576 02 1	.00000000 00 0	.00000000 00 0
212046.000	.35569108 03 1	.24434330 02 1	.00000000 00 0	.00000000 00 0
212056.000	.35509245 03 1	.23472668 02 1	.00000000 00 0	.00000000 00 0
212106.000	.35450504 03 1	.22524696 02 1	.00000000 00 0	.00000000 00 0
212116.000	.35392906 03 1	.21590507 02 1	.00000000 00 0	.00000000 00 0
212126.000	.35336467 03 1	.20670132 02 1	.00000000 00 0	.00000000 00 0
212136.000	.35281200 03 1	.19763653 02 1	.00000000 00 0	.00000000 00 0
212146.000	.35227112 03 1	.18871052 02 1	.00000000 00 0	.00000000 00 0
212156.000	.35174209 03 1	.17992328 02 1	.00000000 00 0	.00000000 00 0
212206.000	.35123492 03 1	.17127460 02 1	.00000000 00 0	.00000000 00 0
212216.000	.35071959 03 1	.16276409 02 1	.00000000 00 0	.00000000 00 0
212226.000	.35022606 03 1	.15439094 02 1	.00000000 00 0	.00000000 00 0
212236.000	.34974426 03 1	.14615444 02 1	.00000000 00 0	.00000000 00 0
212246.000	.34927409 03 1	.13805378 02 1	.00000000 00 0	.00000000 00 0
212256.000	.34881544 03 1	.13008770 02 1	.00000000 00 0	.00000000 00 0
212306.000	.34836818 03 1	.12225529 02 1	.00000000 00 0	.00000000 00 0
212316.000	.34793216 03 1	.11455501 02 1	.00000000 00 0	.00000000 00 0
212326.000	.34750721 03 1	.10698563 02 1	.00000000 00 0	.00000000 00 0
212336.000	.34709316 03 1	.99545593 01 1	.00000000 00 0	.00000000 00 0
212346.000	.34668981 03 1	.92233505 01 1	.00000000 00 0	.00000000 00 0
212356.000	.34629698 03 1	.85047607 01 1	.00000000 00 0	.00000000 00 0
212406.000	.34591445 03 1	.77986106 01 1	.00000000 00 0	.00000000 00 0
212416.000	.34554202 03 1	.71047439 01 1	.00000000 00 0	.00000000 00 0
212426.000	.34517947 03 1	.64229698 01 1	.00000000 00 0	.00000000 00 0
212436.000	.34482658 03 1	.57531242 01 1	.00000000 00 0	.00000000 00 0
212446.000	.34448313 03 1	.50950012 01 1	.00000000 00 0	.00000000 00 0
212456.000	.34414889 03 1	.44484291 01 1	.00000000 00 0	.00000000 00 0
212466.000	.34381695 03 1	.35804313 03 1	.00000000 00 0	.00000000 00 0
212476.000	.34347618 03 1	.35752015 03 1	.00000000 00 0	.00000000 00 0
212486.000	.34314186 03 1	.35700624 03 1	.00000000 00 0	.00000000 00 0
212496.000	.34281212 03 1	.35410355 03 1	.00000000 00 0	.00000000 00 0
212506.000	.34248204 03 1	.35364829 03 1	.00000000 00 0	.00000000 00 0
212516.000	.34215641 03 1	.35276076 03 1	.00000000 00 0	.00000000 00 0
212526.000	.34183582 03 1	.35180000 00 0	.00000000 00 0	.00000000 00 0
212536.000	.34151674 03 1	.35080000 00 0	.00000000 00 0	.00000000 00 0
212546.000	.34120000 03 1	.34980000 00 0	.00000000 00 0	.00000000 00 0
212556.000	.34088295 03 1	.34880000 00 0	.00000000 00 0	.00000000 00 0
212566.000	.34056413 03 1	.34780000 00 0	.00000000 00 0	.00000000 00 0
212576.000	.34024531 03 1	.34680000 00 0	.00000000 00 0	.00000000 00 0
212586.000	.34000000 03 1	.34580000 00 0	.00000000 00 0	.00000000 00 0
212596.000	.33975000 03 1	.34480000 00 0	.00000000 00 0	.00000000 00 0
212606.000	.33950000 03 1	.34380000 00 0	.00000000 00 0	.00000000 00 0
212616.000	.33925000 03 1	.34280000 00 0	.00000000 00 0	.00000000 00 0
212626.000	.33900000 03 1	.34180000 00 0	.00000000 00 0	.00000000 00 0
212636.000	.33875000 03 1	.34080000 00 0	.00000000 00 0	.00000000 00 0
212646.000	.33850000 03 1	.33980000 00 0	.00000000 00 0	.00000000 00 0
212656.000	.33825000 03 1	.33880000 00 0	.00000000 00 0	.00000000 00 0
212666.000	.33800000 03 1	.33780000 00 0	.00000000 00 0	.00000000 00 0
212676.000	.33775000 03 1	.33680000 00 0	.00000000 00 0	.00000000 00 0
212686.000	.33750000 03 1	.33580000 00 0	.00000000 00 0	.00000000 00 0
212696.000	.33725000 03 1	.33480000 00 0	.00000000 00 0	.00000000 00 0
212706.000	.33700000 03 1	.33380000 00 0	.00000000 00 0	.00000000 00 0
212716.000	.33675000 03 1	.33280000 00 0	.00000000 00 0	.00000000 00 0
212726.000	.33650000 03 1	.33180000 00 0	.00000000 00 0	.00000000 00 0
212736.000	.33625000 03 1	.33080000 00 0	.00000000 00 0	.00000000 00 0
212746.000	.33600000 03 1	.32980000 00 0	.00000000 00 0	.00000000 00 0
212756.000	.33575000 03 1	.32880000 00 0	.00000000 00 0	.00000000 00 0
212766.000	.33550000 03 1	.32780000 00 0	.00000000 00 0	.00000000 00 0
212776.000	.33525000 03 1	.32680000 00 0	.00000000 00 0	.00000000 00 0
212786.000	.33500000 03 1	.32580000 00 0	.00000000 00 0	.00000000 00 0
212796.000	.33475000 03 1	.32480000 00 0	.00000000 00 0	.00000000 00 0
212806.000	.33450000 03 1	.32380000 00 0	.00000000 00 0	.00000000 00 0
212816.000	.33425000 03 1	.32280000 00 0	.00000000 00 0	.00000000 00 0
212826.000	.33400000 03 1	.32180000 00 0	.00000000 00 0	.00000000 00 0
212836.000	.33375000 03 1	.32080000 00 0	.00000000 00 0	.00000000 00 0
212846.000	.33350000 03 1	.31980000 00 0	.00000000 00 0	.00000000 00 0
212856.000	.33325000 03 1	.31880000 00 0	.00000000 00 0	.00000000 00 0
212866.000	.33300000 03 1	.31780000 00 0	.00000000 00 0	.00000000 00 0
212876.000	.33275000 03 1	.31680000 00 0	.00000000 00 0	.00000000 00 0
212886.000	.33250000 03 1	.31580000 00 0	.00000000 00 0	.00000000 00 0
212896.000	.33225000 03 1	.31480000 00 0	.00000000 00 0	.00000000 00 0
212906.000	.33200000 03 1	.31380000 00 0	.00000000 00 0	.00000000 00 0
212916.000	.33175000 03 1	.31280000 00 0	.00000000 00 0	.00000000 00 0
212926.000	.33150000 03 1	.31180000 00 0	.00000000 00 0	.00000000 00 0
212936.000	.33125000 03 1	.31080000 00 0	.00000000 00 0	.00000000 00 0
212946.000	.33100000 03 1	.30980000 00 0	.00000000 00 0	.00000000 00 0
212956.000	.33075000 03 1	.30880000 00 0	.00000000 00 0	.00000000 00 0
212966.000	.33050000 03 1	.30780000 00 0	.00000000 00 0	.00000000 00 0
212976.000	.33025000 03 1	.30680000 00 0	.00000000 00 0	.00000000 00 0
212986.000	.33000000 03 1	.30580000 00 0	.00000000 00 0	.00000000 00 0
212996.000	.32975000 03 1	.30480000 00 0	.00000000 00 0	.00000000 00 0
213006.000	.32950000 03 1	.30380000 00 0	.00000000 00 0	.00000000 00 0
213016.000	.32925000 03 1	.30280000 00 0	.00000000 00 0	.00000000 00 0
213026.000	.32900000 03 1	.30180000 00 0	.00000000 00 0	.00000000 00 0
213036.000	.32875000 03 1	.30080000 00 0	.00000000 00 0	.00000000 00 0
213046.000	.32850000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213056.000	.32825000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213066.000	.32800000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213076.000	.32775000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213086.000	.32750000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213096.000	.32725000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213106.000	.32700000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213116.000	.32675000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213126.000	.32650000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213136.000	.32625000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213146.000	.32600000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213156.000	.32575000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213166.000	.32550000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213176.000	.32525000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213186.000	.32500000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213196.000	.32475000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213206.000	.32450000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213216.000	.32425000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213226.000	.32400000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213236.000	.32375000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213246.000	.32350000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213256.000	.32325000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213266.000	.32300000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213276.000	.32275000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213286.000	.32250000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213296.000	.32225000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213306.000	.32200000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213316.000	.32175000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213326.000	.32150000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213336.000	.32125000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213346.000	.32100000 03 1	.30000000 00 0	.00000000 00 0	.00000000 00 0
213356.000	.32075000 03 1	.30000000 00 0	.0	

TIME	EL/DEC	JOBJET	ITERATION 3	C1/C2/C3/R.	RANGE
213616.000	.33369265 03 1	AZ/HA	.0118	.00000000 00 0	.00000000 00 0
213626.000	.33363184 03 1	.33853566 03 1	.0099	.00000000 00 0	.00000000 00 0
213636.000	.33357229 03 1	.33832151 03 1	.0112	.00000000 00 0	.00000000 00 0
213646.000	.33351397 03 1	.33811028 03 1	.0135	.00000000 00 0	.00000000 00 0
213656.000	.33345685 03 1	.33790192 03 1	.0111	.00000000 00 0	.00000000 00 0
213706.000	.33340089 03 1	.33768634 03 1	.0098	.00000000 00 0	.00000000 00 0
213716.000	.33334607 03 1	.33749355 03 1	.0099	.00000000 00 0	.00000000 00 0
213726.000	.33329237 03 1	.33729347 03 1	.0133	.00000000 00 0	.00000000 00 0
213736.000	.33323974 03 1	.33709605 03 1	.0081	.00000000 00 0	.00000000 00 0
213746.000	.33318817 03 1	.33690125 03 1	.0043	.00000000 00 0	.00000000 00 0
213756.000	.33313763 03 1	.33670903 03 1	.0020	.00000000 00 0	.00000000 00 0
213806.000	.33308810 03 1	.33651933 03 1	.0092	.00000000 00 0	.00000000 00 0
213816.000	.33303955 03 1	.33633213 03 1	.0099	.00000000 00 0	.00000000 00 0
213826.000	.33299196 03 1	.33614737 03 1	.0103	.00000000 00 0	.00000000 00 0
213836.000	.33294530 03 1	.33596501 03 1	.0102	.00000000 00 0	.00000000 00 0
213846.000	.33289956 03 1	.33578502 03 1	.0119	.00000000 00 0	.00000000 00 0
213856.000	.33285471 03 1	.33560733 03 1	.0112	.00000000 00 0	.00000000 00 0
213906.000	.33281073 03 1	.33543195 03 1	.0124	.00000000 00 0	.00000000 00 0
213916.000	.33276760 03 1	.33525881 03 1	.0073	.00000000 00 0	.00000000 00 0
213926.000	.33272531 03 1	.33508788 03 1	.0100	.00000000 00 0	.00000000 00 0
213936.000	.33268382 03 1	.33491913 03 1	.0126	.00000000 00 0	.00000000 00 0
213946.000	.33264313 03 1	.33475251 03 1	.0091	.00000000 00 0	.00000000 00 0
213956.000	.33260321 03 1	.33458799 03 1	.0135	.00000000 00 0	.00000000 00 0
214006.000	.33256406 03 1	.33442554 03 1	.0099	.00000000 00 0	.00000000 00 0
214016.000	.33252564 03 1	.33426513 03 1	.0083	.00000000 00 0	.00000000 00 0
214026.000	.33248795 03 1	.33410671 03 1	.0087	.00000000 00 0	.00000000 00 0
214036.000	.33245096 03 1	.33395028 03 1	.0052	.00000000 00 0	.00000000 00 0
214046.000	.33241467 03 1	.33379578 03 1	.0118	.00000000 00 0	.00000000 00 0
214056.000	.33237905 03 1	.33364319 03 1	.0045	.00000000 00 0	.00000000 00 0
214106.000	.33234410 03 1	.33349249 03 1	.0093	.00000000 00 0	.00000000 00 0
214116.000	.33230979 03 1	.33334363 03 1	.0123	.00000000 00 0	.00000000 00 0
214126.000	.33227612 03 1	.33319660 03 1	.0075	.00000000 00 0	.00000000 00 0
214136.000	.33224306 03 1	.33305135 03 1	.0130	.00000000 00 0	.00000000 00 0
214146.000	.33221061 03 1	.33290787 03 1	.0087	.00000000 00 0	.00000000 00 0
214156.000	.33217876 03 1	.33276613 03 1	.0087	.00000000 00 0	.00000000 00 0
214206.000	.33214748 03 1	.33262611 03 1	.0070	.00000000 00 0	.00000000 00 0
214216.000	.33211678 03 1	.33248777 03 1	.0067	.00000000 00 0	.00000000 00 0
214226.000	.33208663 03 1	.33235109 03 1	.0101	.00000000 00 0	.00000000 00 0
214236.000	.33205702 03 1	.33221605 03 1	.0119	.00000000 00 0	.00000000 00 0
214246.000	.33202795 03 1	.33208262 03 1	.0142	.00000000 00 0	.00000000 00 0
214256.000	.33199939 03 1	.33195078 03 1	.0129	.00000000 00 0	.00000000 00 0
214306.000	.33197135 03 1	.33182050 03 1	.0141	.00000000 00 0	.00000000 00 0
214316.000	.33194381 03 1	.33169177 03 1	.0138	.00000000 00 0	.00000000 00 0
214326.000	.33191675 03 1	.33156455 03 1	.0100	.00000000 00 0	.00000000 00 0
214336.000	.33189018 03 1	.33143883 03 1	.0088	.00000000 00 0	.00000000 00 0
214346.000	.33186408 03 1	.33131459 03 1	.0081	.00000000 00 0	.00000000 00 0
214356.000	.33183844 03 1	.33119180 03 1	.0100	.00000000 00 0	.00000000 00 0
214406.000	.33181325 03 1	.33107045 03 1	.0105	.00000000 00 0	.00000000 00 0
214416.000	.33178850 03 1	.33095051 03 1	.0137	.00000000 00 0	.00000000 00 0
214426.000	.33176418 03 1	.33083195 03 1	.0075	.00000000 00 0	.00000000 00 0
214436.000	.33174029 03 1	.33071477 03 1	.0079	.00000000 00 0	.00000000 00 0
214446.000	.33171682 03 1	.33059895 03 1	.0191	.00000000 00 0	.00000000 00 0
214456.000	.33169375 03 1	.33048447 03 1	.0069	.00000000 00 0	.00000000 00 0
214506.000	.33167109 03 1	.33037130 03 1	.0055	.00000000 00 0	.00000000 00 0
214516.000	.33164881 03 1	.33025943 03 1	.0088	.00000000 00 0	.00000000 00 0
214526.000	.33162692 03 1	.33014883 03 1	.0088	.00000000 00 0	.00000000 00 0
		.33003951 03 1			



TIME	EL/DEC	JOB#	ITERATION	CL/C2/C3/R.	RANGE
214536.000	.33100540 03 1	32993142 03 1	.0109	.00000000 00 0	.00000000 00 0
214546.000	.33158426 03 1	32982457 03 1	.0057	.00000000 00 0	.00000000 00 0
214556.000	.33156348 03 1	32971893 03 1	.0073	.00000000 00 0	.00000000 00 0
214606.000	.33154305 03 1	32961449 03 1	.0137	.00000000 00 0	.00000000 00 0
214616.000	.33152298 03 1	32951122 03 1	.0090	.00000000 00 0	.00000000 00 0
214626.000	.33150324 03 1	32940913 03 1	.0070	.00000000 00 0	.00000000 00 0
214636.000	.00000000 00 0	32930817 03 1	.0622	.00000000 00 0	.00000000 00 0
214646.000	.00000000 00 0	32920835 03 1	.0620	.00000000 00 0	.00000000 00 0
214656.000	.33144602 03 1	32910966 03 1	.0084	.00000000 00 0	.00000000 00 0
214706.000	.33142759 03 1	32901206 03 1	.0060	.00000000 00 0	.00000000 00 0
214716.000	.00000000 00 0	32891556 03 1	.0588	.00000000 00 0	.00000000 00 0
214726.000	.00000000 00 0	32882013 03 1	.0622	.00000000 00 0	.00000000 00 0
214736.000	.00000000 00 0	32872577 03 1	.0566	.00000000 00 0	.00000000 00 0
214746.000	.00000000 00 0	32863245 03 1	.0539	.00000000 00 0	.00000000 00 0
214756.000	.00000000 00 0	32854018 03 1	.0562	.00000000 00 0	.00000000 00 0
214806.000	.00000000 00 0	32844891 03 1	.0574	.00000000 00 0	.00000000 00 0
214816.000	.00000000 00 0	32835866 03 1	.0497	.00000000 00 0	.00000000 00 0
214826.000	.00000000 00 0	32826941 03 1	.0509	.00000000 00 0	.00000000 00 0
214836.000	.00000000 00 0	32818114 03 1	.0512	.00000000 00 0	.00000000 00 0
214846.000	.00000000 00 0	32809385 03 1	.0525	.00000000 00 0	.00000000 00 0
214856.000	.00000000 00 0	32800750 03 1	.0648	.00000000 00 0	.00000000 00 0
214906.000	.00000000 00 0	32792212 03 1	.0802	.00000000 00 0	.00000000 00 0
214916.000	.00000000 00 0	32783766 03 1	.0587	.00000000 00 0	.00000000 00 0
214926.000	.00000000 00 0	32775413 03 1	.0056	.00000000 00 0	.00000000 00 0
214936.000	.33119977 03 1	32767153 03 1	.0042	.00000000 00 0	.00000000 00 0
214946.000	.33118546 03 1	32758981 03 1	.0059	.00000000 00 0	.00000000 00 0
214956.000	.33117138 03 1	32750899 03 1	.0047	.00000000 00 0	.00000000 00 0
215006.000	.33114392 03 1	32742904 03 1	.0026	.00000000 00 0	.00000000 00 0
215016.000	.33113053 03 1	32734998 03 1	.0017	.00000000 00 0	.00000000 00 0
215026.000	.33111736 03 1	32727177 03 1	.0039	.00000000 00 0	.00000000 00 0
215036.000	.33110440 03 1	32719442 03 1	.0052	.00000000 00 0	.00000000 00 0
215046.000	.33109166 03 1	32711789 03 1	.0017	.00000000 00 0	.00000000 00 0
215056.000	.33107913 03 1	32704220 03 1	.0006	.00000000 00 0	.00000000 00 0
215106.000	.33106681 03 1	32696734 03 1	.0002	.00000000 00 0	.00000000 00 0
215116.000	.33105469 03 1	32689328 03 1	.0022	.00000000 00 0	.00000000 00 0
215126.000	.33104276 03 1	32682003 03 1	.0015	.00000000 00 0	.00000000 00 0
215136.000	.33103104 03 1	32674756 03 1	.0119	.00000000 00 0	.00000000 00 0
215146.000	.33101950 03 1	32667588 03 1	.0096	.00000000 00 0	.00000000 00 0
215156.000	.33100815 03 1	32660497 03 1	.0025	.00000000 00 0	.00000000 00 0
215206.000	.33099700 03 1	32653483 03 1	.0026	.00000000 00 0	.00000000 00 0
215216.000	.33098602 03 1	32646545 03 1	.0100	.00000000 00 0	.00000000 00 0
215226.000	.33097523 03 1	32639682 03 1	.0126	.00000000 00 0	.00000000 00 0
215236.000	.33096461 03 1	32632893 03 1	.0104	.00000000 00 0	.00000000 00 0
215246.000	.33095416 03 1	32626176 03 1	.0056	.00000000 00 0	.00000000 00 0
215256.000	.33094389 03 1	32619532 03 1	.0040	.00000000 00 0	.00000000 00 0
215306.000	.00000000 00 0	32612959 03 1	.0587	.00000000 00 0	.00000000 00 0
215316.000	.00000000 00 0	32606457 03 1	.0578	.00000000 00 0	.00000000 00 0
215326.000	.00000000 00 0	32600025 03 1	.0601	.00000000 00 0	.00000000 00 0
215336.000	.00000000 00 0	32593663 03 1	.0577	.00000000 00 0	.00000000 00 0
215346.000	.00000000 00 0	32587368 03 1	.0567	.00000000 00 0	.00000000 00 0
215406.000	.00000000 00 0	32574983 03 1	.0585	.00000000 00 0	.00000000 00 0
215416.000	.33086756 03 1	32568890 03 1	.0083	.00000000 00 0	.00000000 00 0
215426.000	.33085871 03 1	32562862 03 1	.0045	.00000000 00 0	.00000000 00 0
215436.000	.33085001 03 1	32556900 03 1	.0081	.00000000 00 0	.00000000 00 0
215446.000	.33084145 03 1	32551000 03 1	.0071	.00000000 00 0	.00000000 00 0
215456.000	.33083303 03 1	32545165 03 1	.0074	.00000000 00 0	.00000000 00 0

ITERATION 3									
TIME	EL/DEC	AZ/HA	JOBJET	C1/C2/C3/R.	RANGE				
215506.000	.33082476 03 1	.32539393 03 1		.0051	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215516.000	.33081661 03 1	.32533683 03 1		.0062	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215526.000	.33080860 03 1	.32528034 03 1		.0047	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215536.000	.33080073 03 1	.32522447 03 1		.0065	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215546.000	.33079299 03 1	.32516918 03 1		.0038	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215606.000	.33077788 03 1	.32506041 03 1		.0065	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215616.000	.33077052 03 1	.32500691 03 1		.0060	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215626.000	.33076328 03 1	.32495398 03 1		.0049	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215636.000	.33075616 03 1	.32490163 03 1		.0073	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215646.000	.33074916 03 1	.32484984 03 1		.0050	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215656.000	.33074228 03 1	.32479861 03 1		.0043	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215706.000	.33073551 03 1	.32474793 03 1		.0089	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215716.000	.33072886 03 1	.32469781 03 1		.0050	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215726.000	.33072231 03 1	.32464823 03 1		.0086	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215736.000	.33071589 03 1	.32459919 03 1		.0076	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215746.000	.33070957 03 1	.32455068 03 1		.0081	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215756.000	.33070335 03 1	.32450269 03 1		.0061	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215806.000	.33069725 03 1	.32445524 03 1		.0035	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215816.000	.33069124 03 1	.32440830 03 1		.0084	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215826.000	.33068534 03 1	.32436187 03 1		.0048	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215836.000	.33067954 03 1	.32431595 03 1		.0067	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215846.000	.33067384 03 1	.32427053 03 1		.0082	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215856.000	.33066824 03 1	.32422561 03 1		.0071	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215906.000	.33066273 03 1	.32418118 03 1		.0055	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215916.000	.33065732 03 1	.32413725 03 1		.0034	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215926.000	.33065201 03 1	.32409380 03 1		.0068	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215936.000	.33064678 03 1	.32405082 03 1		.0018	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215946.000	.33064165 03 1	.32400832 03 1		.0043	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
215956.000	.33063661 03 1	.32396629 03 1		.0003	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220006.000	.33063165 03 1	.32392473 03 1		.0038	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220016.000	.33062679 03 1	.32388362 03 1		.0089	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220026.000	.33062201 03 1	.32384298 03 1		.0136	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220036.000	.33061732 03 1	.32380278 03 1		.0077	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220046.000	.33061271 03 1	.32376304 03 1		.0075	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220056.000	.33060818 03 1	.32372375 03 1		.0067	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220106.000	.33060373 03 1	.32368489 03 1		.0056	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220116.000	.33059937 03 1	.32364647 03 1		.0120	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220126.000	.33059509 03 1	.32360848 03 1		.0120	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220136.000	.33059087 03 1	.32357093 03 1		.0075	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220146.000	.33058674 03 1	.32353378 03 1		.0126	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220156.000	.33058269 03 1	.32349707 03 1		.0133	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220206.000	.33057871 03 1	.32346077 03 1		.0096	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220216.000	.33057481 03 1	.32342489 03 1		.0095	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220226.000	.33057097 03 1	.32338942 03 1		.0089	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220236.000	.33056721 03 1	.32335345 03 1		.0040	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220246.000	.33056352 03 1	.32331968 03 1		.0027	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220256.000	.33055991 03 1	.32328542 03 1		.0049	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220306.000	.33055635 03 1	.32325155 03 1		.0048	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220316.000	.33055287 03 1	.32321807 03 1		.0082	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220326.000	.33054946 03 1	.32318499 03 1		.0073	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220336.000	.33054611 03 1	.32315229 03 1		.0060	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220346.000	.33054283 03 1	.32311996 03 1		.0063	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220356.000	.33053961 03 1	.32308802 03 1		.0002	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220406.000	.33053645 03 1	.32305000 00 0		.0000	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220416.000	.33053326 03 0	.32302526 03 0		-.5289	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000
220426.000	.33053000 00 0	.32299443 03 0		-.8821	.00000000 00 0	.0000	.00000000 00 0	.0000	.0000

## JOBJET ITERATION 3

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE	
220436.000	.00000000 00 0	.32296397 03 0	.00000000 00 0	.0000	.0000
220446.000	.33052445 03 1	.32293387 03 0	.00000000 00 0	.0000	.0000
220456.000	.33052160 03 1	.32290414 03 1	.00000000 00 0	.0000	.0000
220506.000	.33051881 03 1	.32287475 03 1	.00000000 00 0	.0000	.0000
220516.000	.33051608 03 1	.32284572 03 1	.00000000 00 0	.0000	.0000
220526.000	.33051340 03 1	.32281705 03 1	.00000000 00 0	.0000	.0000
220536.000	.33051079 03 1	.32278873 03 1	.00000000 00 0	.0000	.0000
220546.000	.33050822 03 1	.32276074 03 1	.00000000 00 0	.0000	.0000
220556.000	.33050572 03 1	.32273310 03 1	.00000000 00 0	.0000	.0000
220606.000	.33050326 03 1	.32270580 03 1	.00000000 00 0	.0000	.0000
220616.000	.33050086 03 1	.32267883 03 1	.00000000 00 0	.0000	.0000
220626.000	.33049851 03 1	.32265220 03 1	.00000000 00 0	.0000	.0000
220636.000	.33049622 03 1	.32262590 03 1	.00000000 00 0	.0000	.0000
220646.000	.33049398 03 1	.32259993 03 1	.00000000 00 0	.0000	.0000
220656.000	.33049179 03 1	.32257428 03 1	.00000000 00 0	.0000	.0000
220706.000	.33048965 03 1	.32254896 03 1	.00000000 00 0	.0000	.0000
220716.000	.33048755 03 1	.32252356 03 1	.00000000 00 0	.0000	.0000
220726.000	.00000000 00 0	.32249927 03 1	.00000000 00 0	.0000	.0000
220736.000	.33048352 03 1	.32247490 03 1	.00000000 00 0	.0000	.0000
220746.000	.33048157 03 1	.32245085 03 1	.00000000 00 0	.0000	.0000
220756.000	.33047967 03 1	.32242710 03 1	.00000000 00 0	.0000	.0000
220806.000	.33047782 03 1	.32240367 03 1	.00000000 00 0	.0000	.0000
220816.000	.33047601 03 1	.32238053 03 1	.00000000 00 0	.0000	.0000
220826.000	.33047425 03 1	.32235771 03 1	.00000000 00 0	.0000	.0000
220836.000	.33047254 03 1	.32233518 03 1	.00000000 00 0	.0000	.0000
220846.000	.33047086 03 1	.32231295 03 1	.00000000 00 0	.0000	.0000
220856.000	.33046923 03 1	.32229101 03 1	.00000000 00 0	.0000	.0000
220906.000	.33046765 03 1	.32226937 03 1	.00000000 00 0	.0000	.0000
220916.000	.33046610 03 1	.32224802 03 1	.00000000 00 0	.0000	.0000
220926.000	.33046461 03 1	.32222696 03 1	.00000000 00 0	.0000	.0000
220936.000	.33046315 03 1	.32220619 03 1	.00000000 00 0	.0000	.0000
220946.000	.33046173 03 1	.32218570 03 1	.00000000 00 0	.0000	.0000
220956.000	.33046035 03 1	.32216550 03 1	.00000000 00 0	.0000	.0000
221006.000	.33045901 03 1	.32214557 03 1	.00000000 00 0	.0000	.0000
221016.000	.33045772 03 1	.32212593 03 1	.00000000 00 0	.0000	.0000
221026.000	.33045646 03 1	.32210656 03 1	.00000000 00 0	.0000	.0000
221036.000	.00000000 00 0	.32208746 03 1	.00000000 00 0	.0000	.0000
221046.000	.33045406 03 1	.32206864 03 1	.00000000 00 0	.0000	.0000
221056.000	.33045291 03 1	.32205008 03 1	.00000000 00 0	.0000	.0000
221106.000	.33045181 03 1	.32203180 03 1	.00000000 00 0	.0000	.0000
221116.000	.33045074 03 1	.32201378 03 1	.00000000 00 0	.0000	.0000
221126.000	.33044970 03 1	.32199602 03 1	.00000000 00 0	.0000	.0000
221136.000	.33044871 03 1	.32197852 03 1	.00000000 00 0	.0000	.0000
221146.000	.33044774 03 1	.32196130 03 1	.00000000 00 0	.0000	.0000
221156.000	.33044682 03 1	.32194432 03 1	.00000000 00 0	.0000	.0000
221206.000	.33044593 03 1	.32192760 03 1	.00000000 00 0	.0000	.0000
221216.000	.33044507 03 1	.32191114 03 1	.00000000 00 0	.0000	.0000
221226.000	.33044424 03 1	.32189492 03 1	.00000000 00 0	.0000	.0000
221236.000	.33044345 03 1	.32187897 03 1	.00000000 00 0	.0000	.0000
221246.000	.33044269 03 1	.32186325 03 1	.00000000 00 0	.0000	.0000
221256.000	.33044197 03 1	.00000000 00 0	.00000000 00 0	.0000	.0000
221306.000	.33044127 03 1	.32183256 03 1	.00000000 00 0	.0000	.0000
221316.000	.33044061 03 1	.32181759 03 1	.00000000 00 0	.0000	.0000
221326.000	.33043998 03 1	.32180286 03 1	.00000000 00 0	.0000	.0000
221336.000	.33043939 03 1	.32178837 03 1	.00000000 00 0	.0000	.0000
221346.000	.33043882 03 1	.32177411 03 1	.00000000 00 0	.0000	.0000

TIME	EL/DEC	AZ/HA	JOBJET	ITERATION 3	C1/C2/C3/R.	RANGE	
221356.000	.33043828 03 1	.32176009 03 1		.0096	.00000000 00 0	.0000	.0000
221406.000	.33043777 03 1	.32174630 03 1		.0114	.00000000 00 0	.0000	.0000
221416.000	.33043730 03 1	.32173276 03 1		.0089	.00000000 00 0	.0000	.0000
221436.000	.33043643 03 1	.32170635 03 1		.0073	.00000000 00 0	.0000	.0000
221446.000	.33043604 03 1	.32169349 03 1		.0042	.00000000 00 0	.0000	.0000
221456.000	.33043567 03 1	.32168087 03 1		.0088	.00000000 00 0	.0000	.0000
221506.000	.33043534 03 1	.32166845 03 1		.0072	.00000000 00 0	.0000	.0000
221516.000	.33043503 03 1	.32165627 03 1		.0074	.00000000 00 0	.0000	.0000
221526.000	.33043475 03 1	.32164431 03 1		.0074	.00000000 00 0	.0000	.0000
221626.000	.33043363 03 1	.32157712 03 1		.0119	.00000000 00 0	.0000	.0000
221636.000	.33043353 03 1	.32156667 03 1		.0085	.00000000 00 0	.0000	.0000
221646.000	.33043346 03 1	.32155644 03 1		.0090	.00000000 00 0	.0000	.0000
221656.000	.33043341 03 1	.32154641 03 1		.0092	.00000000 00 0	.0000	.0000
221706.000	.33043339 03 1	.32153659 03 1		.0050	.00000000 00 0	.0000	.0000
221716.000	.33043339 03 1	.32152697 03 1		.0066	.00000000 00 0	.0000	.0000
221726.000	.33043341 03 1	.32151756 03 1		.0061	.00000000 00 0	.0000	.0000
221736.000	.33043346 03 1	.32150835 03 1		.0113	.00000000 00 0	.0000	.0000
221746.000	.33043353 03 1	.32149936 03 1		.0103	.00000000 00 0	.0000	.0000
221756.000	.33043362 03 1	.32149055 03 1		.0111	.00000000 00 0	.0000	.0000
221806.000	.33043374 03 1	.32148194 03 1		.0097	.00000000 00 0	.0000	.0000
221816.000	.33043388 03 1	.32147354 03 1		.0161	.00000000 00 0	.0000	.0000
221826.000	.33043404 03 1	.32146532 03 1		.0163	.00000000 00 0	.0000	.0000
221836.000	.33043423 03 1	.32145731 03 1		.0163	.00000000 00 0	.0000	.0000
221846.000	.33043443 03 1	.32144949 03 1		.0121	.00000000 00 0	.0000	.0000
221856.000	.33043466 03 1	.32144187 03 1		.0157	.00000000 00 0	.0000	.0000
221906.000	.33043490 03 1	.32143443 03 1		.0151	.00000000 00 0	.0000	.0000
221916.000	.33043517 03 1	.32142719 03 1		.0144	.00000000 00 0	.0000	.0000
221926.000	.33043546 03 1	.32142013 03 1		.0114	.00000000 00 0	.0000	.0000
221936.000	.33043577 03 1	.32141326 03 1		.0143	.00000000 00 0	.0000	.0000
221946.000	.33043610 03 1	.32140659 03 1		.0110	.00000000 00 0	.0000	.0000
221956.000	.33043645 03 1	.32140009 03 1		.0115	.00000000 00 0	.0000	.0000
222006.000	.33043682 03 1	.32139378 03 1		.0098	.00000000 00 0	.0000	.0000
222016.000	.33043721 03 1	.32138765 03 1		.0099	.00000000 00 0	.0000	.0000
222026.000	.33043762 03 1	.32138170 03 1		.0098	.00000000 00 0	.0000	.0000
222036.000	.33043805 03 1	.32137594 03 1		.0096	.00000000 00 0	.0000	.0000
222046.000	.33043850 03 1	.32137036 03 1		.0072	.00000000 00 0	.0000	.0000
222056.000	.33043896 03 1	.32136495 03 1		.0066	.00000000 00 0	.0000	.0000
222106.000	.33043945 03 1	.32135972 03 1		.0058	.00000000 00 0	.0000	.0000
222116.000	.33043995 03 1	.32135467 03 1		.0069	.00000000 00 0	.0000	.0000
222126.000	.33044047 03 1	.32134980 03 1		.0017	.00000000 00 0	.0000	.0000
222136.000	.33044101 03 1	.32134509 03 1		.0004	.00000000 00 0	.0000	.0000
222146.000	.33044156 03 1	.32134055 03 1		.0050	.00000000 00 0	.0000	.0000
222206.000	.33044273 03 1	.32133202 03 1		.0095	.00000000 00 0	.0000	.0000
222216.000	.33044334 03 1	.32132800 03 1		.0115	.00000000 00 0	.0000	.0000
222226.000	.33044396 03 1	.32132415 03 1		.0134	.00000000 00 0	.0000	.0000
222236.000	.33044461 03 1	.32132047 03 1		.0111	.00000000 00 0	.0000	.0000
222246.000	.33044527 03 1	.32131696 03 1		.0106	.00000000 00 0	.0000	.0000
222256.000	.33044595 03 1	.32131361 03 1		.0119	.00000000 00 0	.0000	.0000
222306.000	.33044663 03 1	.32131043 03 1		.0131	.00000000 00 0	.0000	.0000
222316.000	.33044734 03 1	.32130741 03 1		.0081	.00000000 00 0	.0000	.0000
222326.000	.33044807 03 1	.32130455 03 1		.0110	.00000000 00 0	.0000	.0000
222336.000	.33044881 03 1	.32130186 03 1		.0097	.00000000 00 0	.0000	.0000
222346.000	.33044956 03 1	.32129932 03 1		.0102	.00000000 00 0	.0000	.0000
222356.000	.33045033 03 1	.32129695 03 1		.0066	.00000000 00 0	.0000	.0000
222406.000	.00000000 00 0	.32129474 03 1		.0616	.00000000 00 0	.0000	.0000

JUBJET  
ITERATION 3

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE
22551.000	.33046025 03 1	.32128083 03 1	.0047	.0000
22651.000	.33046614 03 1	.32128031 03 1	.0092	.0000
22751.000	.33047248 03 1	.32128493 03 1	.0086	.0000
22851.000	.33047925 03 1	.32129455 03 1	.0050	.0000
22951.000	.33048642 03 1	.32130898 03 1	.0025	.0000
23051.000	.33049397 03 1	.32132807 03 1	.0094	.0000
23151.000	.33050187 03 1	.32135167 03 1	.0079	.0000
23251.000	.33051009 03 1	.32137965 03 1	.0079	.0000
23351.000	.33051863 03 1	.32141185 03 1	.0037	.0000
23451.000	.33052745 03 1	.32144842 03 1	.0034	.0000
23551.000	.33053656 03 1	.32148842 03 1	.0092	.0000
23651.000	.33054591 03 1	.32153254 03 1	.0091	.0000
23751.000	.33055591 03 1	.32158039 03 1	.0032	.0000
23851.000	.33056533 03 1	.32163187 03 1	.0018	.0000
23951.000	.33057537 03 1	.32168687 03 1	.0048	.0000
24051.000	.33058560 03 1	.32174530 03 1	.0044	.0000
24151.000	.33059602 03 1	.32180703 03 1	.0047	.0000
24251.000	.33060662 03 1	.32187200 03 1	.0037	.0000
24351.000	.33061738 03 1	.32194012 03 1	.0036	.0000
24451.000	.33062830 03 1	.32201127 03 1	.0005	.0000
24551.000	.33063936 03 1	.32208540 03 1	.0004	.0000
24651.000	.33065056 03 1	.32216242 03 1	.0014	.0000
24751.000	.33066189 03 1	.32224225 03 1	.0056	.0000
24851.000	.33067333 03 1	.32232482 03 1	.0071	.0000
24951.000	.33068489 03 1	.32241006 03 1	.0039	.0000
25051.000	.33069655 03 1	.32249790 03 1	.0001	.0000
25151.000	.33070831 03 1	.32258827 03 1	.0023	.0000
25251.000	.33072017 03 1	.32268111 03 1	.0069	.0000
25351.000	.33073413 03 1	.32277636 03 1	.0038	.0000
25451.000	.33074613 03 1	.32287396 03 1	.0038	.0000
25551.000	.33075622 03 1	.32297385 03 1	.0077	.0000
25651.000	.33076838 03 1	.32307599 03 1	.0022	.0000
25751.000	.33078061 03 1	.32318029 03 1	.0019	.0000
25851.000	.33079291 03 1	.32328674 03 1	.0005	.0000
25951.000	.33080525 03 1	.32339526 03 1	.0029	.0000
26051.000	.33081765 03 1	.32350582 03 1	.0005	.0000
26151.000	.33083009 03 1	.32361836 03 1	.0020	.0000
26251.000	.33084512 03 1	.32373824 03 1	.0008	.0000
26351.000	.33102050 03 1	.32551746 03 1	.0004	.0000
26451.000	.33103334 03 1	.32565652 03 1	.0026	.0000
26551.000	.33104618 03 1	.32579697 03 1	.0002	.0000
26651.000	.33105902 03 1	.32593876 03 1	.0016	.0000
26751.000	.33107187 03 1	.32608189 03 1	.0006	.0000
26851.000	.33108473 03 1	.32622633 03 1	.0010	.0000
26951.000	.33109758 03 1	.32637204 03 1	.0033	.0000
27051.000	.33111043 03 1	.32651899 03 1	.0004	.0000
27151.000	.33112328 03 1	.32666719 03 1	.0038	.0000
27251.000	.33113613 03 1	.32681660 03 1	.0069	.0000
27351.000	.33114894 03 1	.32711894 03 1	.0014	.0000
27451.000	.33116183 03 1	.32742584 03 1	.0062	.0000
27551.000	.33117503 03 1	.32758097 03 1	.0007	.0000
27651.000	.33118833 03 1	.32773716 03 1	.0014	.0000
27751.000	.33120033 03 1	.32789442 03 1	.0046	.0000
27851.000	.33121315 03 1	.32805273 03 1	.0031	.0000
27951.000	.33122596 03 1	.32821206 03 1	.0042	.0000
28051.000	.33123877 03 1	.32837240 03 1	.0025	.0000
28151.000	.33125156 03 1			
28251.000	.33126435 03 1			

JCBJET  
ITERATION 3

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE
234151.000	.33134084 03 1	.32935467 03 1	.0015	.00000000 00 0
234351.000	.33136624 03 1	.32968941 03 1	-.0011	.00000000 00 0
234451.000	.33137891 03 1	.32985809 03 1	-.0058	.00000000 00 0
234551.000	.33139158 03 1	.33002762 03 1	-.0093	.00000000 00 0
234651.000	.33140423 03 1	.33019799 03 1	-.0036	.00000000 00 0
234751.000	.33141687 03 1	.33036918 03 1	-.0007	.00000000 00 0
234851.000	.33142949 03 1	.33054119 03 1	-.0027	.00000000 00 0
234951.000	.33144210 03 1	.33071399 03 1	-.0015	.00000000 00 0
235051.000	.33145469 03 1	.33088757 03 1	-.0010	.00000000 00 0
235151.000	.33146727 03 1	.33106154 03 1	-.0013	.00000000 00 0
235251.000	.33147983 03 1	.33123706 03 1	-.0044	.00000000 00 0
235351.000	.33149238 03 1	.33141294 03 1	-.0103	.00000000 00 0
235451.000	.33150491 03 1	.33158955 03 1	-.0012	.00000000 00 0
235551.000	.33151742 03 1	.33176689 03 1	-.0039	.00000000 00 0
235651.000	.33152992 03 1	.33194495 03 1	-.0041	.00000000 00 0
235751.000	.33154240 03 1	.33212371 03 1	.0011	.00000000 00 0
235851.000	.33155487 03 1	.33230316 03 1	.0017	.00000000 00 0
235951.000	.33156732 03 1	.33248330 03 1	-.0004	.00000000 00 0
000051.000	.33157976 03 1	.33266417 03 1	-.0032	.00000000 00 0
000151.000	.33159217 03 1	.33284565 03 1	-.0067	.00000000 00 0
000251.000	.33160457 03 1	.33302778 03 1	-.0068	.00000000 00 0
000351.000	.33161696 03 1	.33321056 03 1	.0025	.00000000 00 0
000451.000	.33162933 03 1	.33339397 03 1	-.0069	.00000000 00 0
000551.000	.33164092 03 1	.33343205 03 1	-.0010	.00000000 00 0
000651.000	.33165319 03 1	.33350729 03 1	-.0000	.00000000 00 0
000751.000	.33166545 03 1	.33369491 03 1	-.0016	.00000000 00 0
000851.000	.33167768 03 1	.33388308 03 1	-.0057	.00000000 00 0
000951.000	.33168990 03 1	.33407182 03 1	-.0044	.00000000 00 0
001051.000	.33170219 03 1	.33426111 03 1	.0043	.00000000 00 0
001151.000	.33171445 03 1	.33445094 03 1	-.0015	.00000000 00 0
001251.000	.33172668 03 1	.33464131 03 1	-.0018	.00000000 00 0
001351.000	.33173890 03 1	.33483222 03 1	-.0027	.00000000 00 0
001451.000	.33175120 03 1	.33502363 03 1	-.0061	.00000000 00 0
001551.000	.33176346 03 1	.33521557 03 1	-.0000	.00000000 00 0
001651.000	.33177566 03 1	.33540802 03 1	-.0053	.00000000 00 0
001751.000	.33178786 03 1	.33560096 03 1	-.0047	.00000000 00 0
001851.000	.33180075 03 1	.33579439 03 1	-.0007	.00000000 00 0
001951.000	.33181287 03 1	.33598832 03 1	-.0027	.00000000 00 0
002051.000	.33182498 03 1	.33618272 03 1	-.0010	.00000000 00 0
002151.000	.33183707 03 1	.33637760 03 1	-.0099	.00000000 00 0
002251.000	.33184914 03 1	.33657295 03 1	-.0072	.00000000 00 0
002351.000	.33186119 03 1	.33676877 03 1	-.0030	.00000000 00 0
002451.000	.33187323 03 1	.33696504 03 1	-.0032	.00000000 00 0
002551.000	.33188526 03 1	.33716176 03 1	-.0059	.00000000 00 0
002651.000	.33189727 03 1	.33735892 03 1	-.0111	.00000000 00 0
002751.000	.33190926 03 1	.33755652 03 1	-.0047	.00000000 00 0
002851.000	.33192123 03 1	.33775456 03 1	-.0007	.00000000 00 0
002951.000	.33193320 03 1	.33795303 03 1	-.0111	.00000000 00 0
003051.000	.33194515 03 1	.33815191 03 1	.0000	.00000000 00 0
003151.000	.33195708 03 1	.33835093 03 1	-.0033	.00000000 00 0
003251.000	.33196899 03 1	.33855093 03 1	-.0110	.00000000 00 0
003351.000	.33198089 03 1	.33875106 03 1	-.0091	.00000000 00 0
003451.000	.33199277 03 1	.33895158 03 1	-.0196	.00000000 00 0
003551.000	.33200464 03 1	.33915250 03 1	-.0025	.00000000 00 0
003651.000	.33201650 03 1	.33935382 03 1	-.0018	.00000000 00 0
003751.000	.33202834 03 1	.33955551 03 1	-.0155	.00000000 00 0
003851.000	.33204016 03 1	.33975729 03 1	-.0000	.00000000 00 0
003951.000	.33205197 03 1	.33995904 03 1	-.0033	.00000000 00 0
004051.000	.33206376 03 1	.34016082 03 1	-.0022	.00000000 00 0
004151.000	.33207555 03 1	.34036255 03 1	-.0091	.00000000 00 0
004251.000	.33208734 03 1	.34056428 03 1	-.0196	.00000000 00 0
004351.000	.33209913 03 1	.34076601 03 1	-.0025	.00000000 00 0
004451.000	.33211092 03 1	.34096774 03 1	-.0018	.00000000 00 0
004551.000	.33212271 03 1	.34116947 03 1	-.0155	.00000000 00 0
004651.000	.33213450 03 1	.34137120 03 1	-.0000	.00000000 00 0
004751.000	.33214629 03 1	.34157293 03 1	-.0033	.00000000 00 0
004851.000	.33215808 03 1	.34177466 03 1	-.0110	.00000000 00 0
004951.000	.33216987 03 1	.34197639 03 1	-.0091	.00000000 00 0
005051.000	.33218166 03 1	.34217812 03 1	-.0196	.00000000 00 0
005151.000	.33219345 03 1	.34237985 03 1	-.0025	.00000000 00 0
005251.000	.33220524 03 1	.34258158 03 1	-.0018	.00000000 00 0
005351.000	.33221703 03 1	.34278331 03 1	-.0155	.00000000 00 0
005451.000	.33222882 03 1	.34298504 03 1	-.0000	.00000000 00 0
005551.000	.33224061 03 1	.34318677 03 1	-.0033	.00000000 00 0
005651.000	.33225240 03 1	.34338850 03 1	-.0110	.00000000 00 0
005751.000	.33226419 03 1	.34359023 03 1	-.0091	.00000000 00 0
005851.000	.33227598 03 1	.34379196 03 1	-.0196	.00000000 00 0
005951.000	.33228777 03 1	.34399369 03 1	-.0025	.00000000 00 0
006051.000	.33229956 03 1	.34419542 03 1	-.0018	.00000000 00 0
006151.000	.33231135 03 1	.34439715 03 1	-.0155	.00000000 00 0
006251.000	.33232314 03 1	.34459888 03 1	-.0000	.00000000 00 0
006351.000	.33233493 03 1	.34480061 03 1	-.0033	.00000000 00 0
006451.000	.33234672 03 1	.34500234 03 1	-.0110	.00000000 00 0
006551.000	.33235851 03 1	.34520407 03 1	-.0091	.00000000 00 0
006651.000	.33237030 03 1	.34540580 03 1	-.0196	.00000000 00 0
006751.000	.33238209 03 1	.34560753 03 1	-.0025	.00000000 00 0
006851.000	.33239388 03 1	.34580926 03 1	-.0018	.00000000 00 0
006951.000	.33240567 03 1	.34601099 03 1	-.0155	.00000000 00 0
007051.000	.33241746 03 1	.34621272 03 1	-.0000	.00000000 00 0
007151.000	.33242925 03 1	.34641445 03 1	-.0033	.00000000 00 0
007251.000	.33244104 03 1	.34661618 03 1	-.0110	.00000000 00 0
007351.000	.33245283 03 1	.34681791 03 1	-.0091	.00000000 00 0
007451.000	.33246462 03 1	.34701964 03 1	-.0196	.00000000 00 0
007551.000	.33247641 03 1	.34722137 03 1	-.0025	.00000000 00 0
007651.000	.33248820 03 1	.34742310 03 1	-.0018	.00000000 00 0
007751.000	.33249999 03 1	.34762483 03 1	-.0155	.00000000 00 0
007851.000	.33251178 03 1	.34782656 03 1	-.0000	.00000000 00 0
007951.000	.33252357 03 1	.34802829 03 1	-.0033	.00000000 00 0
008051.000	.33253536 03 1	.34822999 03 1	-.0110	.00000000 00 0
008151.000	.33254715 03 1	.34843172 03 1	-.0091	.00000000 00 0
008251.000	.33255894 03 1	.34863345 03 1	-.0196	.00000000 00 0
008351.000	.33257073 03 1	.34883518 03 1	-.0025	.00000000 00 0
008451.000	.33258252 03 1	.34903691 03 1	-.0018	.00000000 00 0
008551.000	.33259431 03 1	.34923864 03 1	-.0155	.00000000 00 0
008651.000	.33260610 03 1	.34944037 03 1	-.0000	.00000000 00 0
008751.000	.33261789 03 1	.34964210 03 1	-.0033	.00000000 00 0
008851.000	.33262968 03 1	.34984383 03 1	-.0110	.00000000 00 0
008951.000	.33264147 03 1	.35004556 03 1	-.0091	.00000000 00 0
009051.000	.33265326 03 1	.35024729 03 1	-.0196	.00000000 00 0
009151.000	.33266505 03 1	.35044902 03 1	-.0025	.00000000 00 0
009251.000	.33267684 03 1	.35065075 03 1	-.0018	.00000000 00 0
009351.000	.33268863 03 1	.35085248 03 1	-.0155	.00000000 00 0
009451.000	.33270042 03 1	.35105421 03 1	-.0000	.00000000 00 0
009551.000	.33271221 03 1	.35125594 03 1	-.0033	.00000000 00 0
009651.000	.33272400 03 1	.35145767 03 1	-.0110	.00000000 00 0
009751.000	.33273579 03 1	.35165940 03 1	-.0091	.00000000 00 0
009851.000	.33274758 03 1	.35186113 03 1	-.0196	.00000000 00 0
009951.000	.33275937 03 1	.35206286 03 1	-.0025	.00000000 00 0
010051.000	.33277116 03 1	.35226459 03 1	-.0018	.00000000 00 0
010151.000	.33278295 03 1	.35246632 03 1	-.0155	.00000000 00 0
010251.000	.33279474 03 1	.35266805 03 1	-.0000	.00000000 00 0
010351.000	.33280653 03 1	.35286978 03 1	-.0033	.00000000 00 0
010451.000	.33281832 03 1	.35307151 03 1	-.0110	.00000000 00 0
010551.000	.33283011 03 1	.35327324 03 1	-.0091	.00000000 00 0
010651.000	.33284190 03 1	.35347497 03 1	-.0196	.00000000 00 0
010751.000	.33285369 03 1	.35367670 03 1	-.0025	.00000000 00 0
010851.000	.33286548 03 1	.35387843 03 1	-.0018	.00000000 00 0
010951.000	.33287727 03 1	.35408016 03 1	-.0155	.00000000 00 0
011051.000	.33288906 03 1	.35428189 03 1	-.0000	.00000000 00 0
011151.000	.33290085 03 1	.35448362 03 1	-.0033	.00000000 00 0
011251.000	.33291264 03 1	.35468535 03 1	-.0110	.00000000 00 0
011351.000	.33292443 03 1	.35488708 03 1	-.0091	.00000000 00 0
011451.000	.33293622 03 1	.35508881 03 1	-.0196	.00000000 00 0
011551.000	.33294801 03 1	.35529054 03 1	-.0025	.00000000 00 0
011651.000	.33295980 03 1	.35549227 03 1	-.0018	.00000000 00 0
011751.000	.33297159 03 1	.35569400 03 1	-.0155	.00000000 00 0
011851.000	.33298338 03 1	.35589573 03 1	-.0000	.00000000 00 0
011951.000	.33299517 03 1	.35609746 03 1	-.0033	.00000000 00 0
012051.000	.33300696 03 1	.35629919 03 1	-.0110	.00000000 00 0
012151.000	.33301875 03 1	.35650092 03 1	-.0091	.00000000 00 0
012251.000	.33303054 03 1	.35670265 03 1	-.0196	.00000000 00 0
012351.000	.33304233 03 1	.35690438 03 1	-.0025	.00000000 00 0
012451.000	.33305412 03 1	.35710611 03 1	-.0018	.00000000 00 0
012551.000	.33306591 03 1	.35730784 03 1	-.0155	.00000000 00 0
012651.000	.33307770 03 1	.35750957 03 1	-.0000	.00000000 00 0
012751.000	.33308949 03 1	.35771130 03 1		

## SUBJECT ITERATION 3

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE
004251.000	.33208731 03 1	.34075759 03 1	-.0195	-.0664
004351.000	.33209906 03 1	.34096006 03 1	-.0120	.0049
004451.000	.33211080 03 1	.34116289 03 1	-.0088	.0713
004551.000	.33212252 03 1	.34136609 03 1	-.0140	.0938
004651.000	.33213423 03 1	.34156965 03 1	-.0175	.0732
004751.000	.33214593 03 1	.34177358 03 1	-.0034	-.0244
004851.000	.33215761 03 1	.34197785 03 1	-.0097	-.0986
004951.000	.33216928 03 1	.34218249 03 1	-.0083	-.0869
005051.000	.33218093 03 1	.34238746 03 1	-.0153	-.0654
005151.000	.33219257 03 1	.34259278 03 1	-.0086	.0254
005251.000	.33220420 03 1	.34279844 03 1	-.0062	.0508
005351.000	.33221584 03 1	.34291075 03 1	-.0065	.0469
005451.000	.33222741 03 1	.34311740 03 1	-.0131	-.0156
005551.000	.33223899 03 1	.34332437 03 1	-.0041	-.0781
005651.000	.33225057 03 1	.34353166 03 1	-.0034	-.1162
005751.000	.33226213 03 1	.34373927 03 1	-.0030	-.0664
005851.000	.33227368 03 1	.34394719 03 1	-.0029	.0088
005951.000	.33228521 03 1	.34415540 03 1	-.0031	.0762
010051.000	.33229673 03 1	.34436393 03 1	-.0096	.0957
010151.000	.33230824 03 1	.34457276 03 1	-.0144	.0684
010251.000	.33231974 03 1	.34478188 03 1	-.0056	-.0234
010351.000	.33233123 03 1	.34499131 03 1	-.0030	-.0752
010451.000	.33234270 03 1	.34520102 03 1	-.0033	-.0879
010551.000	.33235415 03 1	.34541102 03 1	-.0067	-.0596
010651.000	.33236560 03 1	.34562130 03 1	-.0069	.0137
010751.000	.33237704 03 1	.34583186 03 1	-.0095	.0518
010851.000	.33238846 03 1	.34604270 03 1	-.0103	.0986
010951.000	.33239987 03 1	.34625382 03 1	-.0114	.0537
011051.000	.33241127 03 1	.34646519 03 1	-.0048	-.0205
011151.000	.33242266 03 1	.34667685 03 1	-.0085	-.0811
011251.000	.33243404 03 1	.34688877 03 1	-.0104	-.1074
011351.000	.33244541 03 1	.34710095 03 1	-.0126	-.0566
011451.000	.33245676 03 1	.34731339 03 1	-.0130	.0098
011551.000	.33246810 03 1	.34752609 03 1	-.0097	.0576
011651.000	.33247943 03 1	.34773923 03 1	-.0198	.0576
011751.000	.33250206 03 1	.34795223 03 1	-.0113	-.0059
011851.000	.33251336 03 1	.34816568 03 1	-.0069	-.1123
011951.000	.33252469 03 1	.34837948 03 1	-.0171	-.0732
012051.000	.33253592 03 1	.34859330 03 1	-.0075	.0186
012151.000	.33254719 03 1	.34880718 03 1	-.0061	.0615
012251.000	.33255844 03 1	.34902189 03 1	-.0130	.0986
012351.000	.33256969 03 1	.34923653 03 1	-.0161	.0508
012451.000	.33258092 03 1	.34945141 03 1	-.0130	.0000
012551.000	.33259214 03 1	.34966651 03 1	-.0094	.0732
012651.000	.33260336 03 1	.35018184 03 1	-.0094	.0166
012751.000	.33261456 03 1	.35039740 03 1	-.0090	.0000
012851.000	.33262576 03 1	.35061318 03 1	-.0148	.0732
012951.000	.33263694 03 1	.35082918 03 1	-.0188	-.1045
013051.000	.33264811 03 1	.35104539 03 1	-.0090	-.0547
013151.000	.33265928 03 1	.35126182 03 1	-.0154	.0166
013251.000	.33267043 03 1	.35147847 03 1	-.0221	.0000
013351.000	.33268158 03 1	.35169532 03 1	-.0209	.0000
013451.000	.33269271 03 1	.35191238 03 1	-.0100	.0420
013551.000	.33270384 03 1	.35212964 03 1	-.0133	.0205
013651.000	.33271495 03 1	.35234711 03 1	-.0207	-.0752
013751.000	.33272606 03 1	.35256478 03 1	-.0244	-.0977
013851.000	.33273716 03 1	.35278265 03 1	-.0123	-.0684
013951.000	.33274824 03 1	.35300071 03 1	-.0143	-.0049
014051.000				.0732

JCBJET  
ITERATION 3

TIME	EL/DEC	AZ/HA	C1/C2/C3/R.	RANGE
014151.000	.33275932 03 1	.0048	-.0166	.1074
014251.000	.33277039 03 1	-.0063	-.0231	.0586
014351.000	.33278145 03 1	-.0173	-.0137	-.0303
014451.000	.33273250 03 1	-.0004	-.0125	-.0596
014551.000	.33280354 03 1	.0006	-.0156	-.0508
014651.000	.33281458 03 1	-.0025	-.0288	3.4844
014751.000	.33282560 03 1	.0005	-.0162	.0000
014851.000	.33283661 03 1	.0035	-.0137	.0645
014951.000	.33284763 03 1	.0025	-.0195	.0928
015051.000	.33285862 03 1	-.0045	-.0254	.0469
015151.000	.33286961 03 1	.0025	-.0135	3.4111
015251.000	.33288059 03 1	.0075	-.0158	-.0752
015351.000	.33289156 03 1	-.0035	-.0182	-.0908
015451.000	.33290253 03 1	-.0044	-.0228	-.0371
015551.000	.33291348 03 1	.0006	-.0116	.0313
015651.000	.33292443 03 1	-.0023	-.0166	.0938
015751.000	.33303347 03 1	.0047	-.0148	-.3408
020751.000	.33304433 03 1	-.0061	-.0135	-.4141
020851.000	.33305519 03 1	-.0009	-.0163	-.0771
020951.000	.33306603 03 1	.0002	-.0192	-.0977
021051.000	.33307687 03 1	-.0046	-.0223	.0098
021151.000	.33308770 03 1	.0106	-.0176	.0469
021251.000	.33309852 03 1	-.0002	-.0149	.0947
021351.000	.33310934 03 1	-.0110	-.0204	.0459
021451.000	.33312014 03 1	-.0018	-.0261	-.0498
021551.000	.33313094 03 1	-.0006	-.0159	-.0713
021651.000	.33314174 03 1	.0087	-.0138	-.0576
021751.000	.33315253 03 1	.0039	-.0218	.0000
021851.000	.33316331 03 1	-.0031	-.0180	.0000
021951.000	.33317408 03 1	-.0016	-.0123	.0000
022051.000	.33318484 03 1	.0017	-.0214	.0000
022151.000	.33319560 03 1	-.0031	-.0160	.0000
022251.000	.33320636 03 1	-.0138	-.0201	.0000
022351.000	.33321710 03 1	.0095	-.0129	.0000
022451.000	.33322784 03 1	.0148	-.0138	.0000
022551.000	.33323856 03 1	.0041	-.0209	.0000
022651.000	.33324929 03 1	-.0126	-.0201	.0000
022751.000	.33326000 03 1	-.0033	-.0154	.0000
022851.000	.33327071 03 1	-.0060	-.0168	.0000
022951.000	.33328142 03 1	.0014	-.0263	.0000
023051.000	.33329211 03 1	-.0093	-.0200	.0000
023151.000	.33330284 03 1	-.0025	-.0160	.0000
023251.000	.33331351 03 1	.0009	-.0203	.0000
023351.000	.33332429 03 1	-.0037	-.0272	.0000
023451.000	.33333500 03 1	-.0023	-.0175	.0000
023551.000	.33334569 03 1	-.0046	-.0154	.0000
023651.000	.33335631 03 1	-.0144	-.0193	.0000
023751.000	.33336679 03 1	-.0029	-.0252	.0000
023851.000	.33337744 03 1	-.0039	-.0173	.0000
023951.000	.33338814 03 1	-.0046	-.0195	.0000
024051.000	.33339884 03 1	-.0029	-.0258	.0000
024151.000	.33340959 03 1	-.0046	-.0241	.0000
024251.000	.33342030 03 1	-.0144	-.0145	.0000
024351.000	.33343101 03 1	-.0029	-.0216	.0000
024451.000	.33344171 03 1	-.0046	-.0216	.0000
024551.000	.33345242 03 1	-.0046	-.0216	.0000
024651.000	.33346313 03 1	-.0046	-.0216	.0000
024751.000	.33347384 03 1	-.0046	-.0216	.0000
024851.000	.33348455 03 1	-.0046	-.0216	.0000
024951.000	.33349526 03 1	-.0046	-.0216	.0000
025051.000	.33350597 03 1	-.0046	-.0216	.0000
025151.000	.33351668 03 1	-.0046	-.0216	.0000
025251.000	.33352739 03 1	-.0046	-.0216	.0000
025351.000	.33353810 03 1	-.0046	-.0216	.0000
025451.000	.33354881 03 1	-.0046	-.0216	.0000
025551.000	.33355952 03 1	-.0046	-.0216	.0000
025651.000	.33357023 03 1	-.0046	-.0216	.0000
025751.000	.33358094 03 1	-.0046	-.0216	.0000
025851.000	.33359165 03 1	-.0046	-.0216	.0000
025951.000	.33360236 03 1	-.0046	-.0216	.0000
030051.000	.33361307 03 1	-.0046	-.0216	.0000



## JCBJET ITERATION 3

TIME	EL/OEC	AZ/HA	C1/C2/C3/R.	RANGE
030151.000	-0.0080	.11160191 02 1	-.0263	.00000000 00 0
030251.000	-0.0045	.11388954 02 1	-.0191	.00000000 00 0
030351.000	.0051	.11617794 02 1	-.0179	.00000000 00 0
030451.000	.0007	.11846722 02 1	-.0249	.00000000 00 0
030551.000	-.0077	.12075722 02 1	-.0239	.00000000 00 0
030651.000	.0059	.12304806 02 1	-.0150	.00000000 00 0
030751.000	-.0045	.12533962 02 1	-.0221	.00000000 00 0
030851.000	-.0029	.12763195 02 1	-.0273	.00000000 00 0
030951.000	-.0072	.12992504 02 1	-.0266	.00000000 00 0
031051.000	.0056	.13221893 02 1	-.0180	.00000000 00 0
031151.000	-.0060	.13451351 02 1	-.0175	.00000000 00 0
031251.000	-.0043	.13680885 02 1	-.0250	.00000000 00 0
031351.000	.0014	.13910488 02 1	-.0206	.00000000 00 0
031451.000	-.0013	.14139911 02 1	-.0180	.00000000 00 0
031551.000	-.0096	.14369731 02 1	-.0278	.00000000 00 0
031651.000	-.0020	.14598731 02 1	-.0197	.00000000 00 0
031751.000	-.0003	.14828620 02 1	-.0217	.00000000 00 0
031851.000	-.0049	.15059574 02 1	-.0298	.00000000 00 0
031951.000	-.0012	.15290064 02 1	-.0239	.00000000 00 0
032051.000	-.0014	.15519688 02 1	-.0181	.00000000 00 0
032151.000	.0000	.15749843 02 1	-.0000	.00000000 00 0
032251.000	.0000	.15980064 02 1	.0000	.00000000 00 0
032351.000	.0000	.00000000 00 0	.0000	.00000000 00 0
032451.000	.0000	.00000000 00 0	.0000	.00000000 00 0
032551.000	.0000	.00000000 00 0	.0000	.00000000 00 0
032651.000	.0000	.00000000 00 0	.0000	.00000000 00 0
032751.000	.0000	.00000000 00 0	.0000	.00000000 00 0
032851.000	.0000	.00000000 00 0	.0000	.00000000 00 0
032951.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033051.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033151.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033251.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033351.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033451.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033551.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033651.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033751.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033851.000	.0000	.00000000 00 0	.0000	.00000000 00 0
033951.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034051.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034151.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034251.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034351.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034451.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034551.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034651.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034751.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034851.000	.0000	.00000000 00 0	.0000	.00000000 00 0
034951.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035051.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035151.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035251.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035351.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035451.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035551.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035651.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035751.000	.0000	.00000000 00 0	.0000	.00000000 00 0
035851.000	.0000	.00000000 00 0	.0000	.00000000 00 0

ITERATION 3									
TIME	EL/DEC	AZ/HA	JOBJET	ITERATION 3	C1/C2/C3/R.	RANGE			
035951.000	33421886 03 1	0092	24537949 02 1	-0373	11727963 06 1	-0508	00000000 00 0	00 0	0000
040051.000	33422899 03 1	0008	24770161 02 1	-0194	11727297 06 1	-0264	00000000 00 0	00 0	0000
040151.000	33423912 03 1	0152	25002407 02 1	-0197	11726635 06 1	-0850	00000000 00 0	00 0	0000
040251.000	33424924 03 1	0012	25234699 02 1	-0259	11725977 06 1	-0664	00000000 00 0	00 0	0000
040351.000	33425936 03 1	0112	25467029 02 1	-0302	11725323 06 1	-0313	00000000 00 0	00 0	0000
040451.000	33426946 03 1	0072	25699402 02 1	-0165	11724672 06 1	-0106	00000000 00 0	00 0	0000
040551.000	33427957 03 1	0072	25931808 02 1	-0209	11724025 06 1	-0898	00000000 00 0	00 0	0000
040651.000	33428966 03 1	0073	26164257 02 1	-0293	11723381 06 1	-0928	00000000 00 0	00 0	0000
040751.000	33429975 03 1	0027	26396740 02 1	-0277	11722741 06 1	-0518	00000000 00 0	00 0	0000
040851.000	33430983 03 1	0094	26629261 02 1	-0182	11722105 06 1	-0332	00000000 00 0	00 0	0000
040951.000	33431991 03 1	0014	26861816 02 1	-0187	11721471 06 1	-0654	00000000 00 0	00 0	0000
041051.000	33432998 03 1	0035	27094410 02 1	-0273	11720841 06 1	-0449	00000000 00 0	00 0	0000
041151.000	33434004 03 1	0016	27327041 02 1	-0239	11720215 06 1	-0078	00000000 00 0	00 0	0000
041251.000	33435010 03 1	0077	27559707 02 1	-0185	11719592 06 1	-0801	00000000 00 0	00 0	0000
041351.000	33436015 03 1	0058	27792404 02 1	-0172	11718972 06 1	-0811	00000000 00 0	00 0	0000
041451.000	33437020 03 1	0041	28025139 02 1	-0278	11718355 06 1	-0752	00000000 00 0	00 0	0000
041551.000	33438023 03 1	0080	28257900 02 1	-0246	11717742 06 1	-0205	00000000 00 0	00 0	0000
041651.000	33439026 03 1	0181	28490704 02 1	-0173	11717131 06 1	-0439	00000000 00 0	00 0	0000
041751.000	33440029 03 1	0002	28723537 02 1	-0201	11716524 06 1	-0361	00000000 00 0	00 0	0000
041851.000	33441030 03 1	0037	28956402 02 1	-0289	11715920 06 1	-0381	00000000 00 0	00 0	0000
041951.000	33442031 03 1	0025	29189301 02 1	-0197	11715319 06 1	-0303	00000000 00 0	00 0	0000
042051.000	33443031 03 1	0006	29422226 02 1	-0166	11714721 06 1	-0879	00000000 00 0	00 0	0000
042151.000	33444031 03 1	0048	29655185 02 1	-0255	11714125 06 1	-1143	00000000 00 0	00 0	0000
042251.000	33445030 03 1	0051	29888176 02 1	-0305	11713533 06 1	-0703	00000000 00 0	00 0	0000
042351.000	33446029 03 1	0091	30121193 02 1	-0194	11712943 06 1	-0049	00000000 00 0	00 0	0000
042451.000	33447026 03 1	0035	30354240 02 1	-0184	11712357 06 1	-0527	00000000 00 0	00 0	0000
042551.000	33448023 03 1	0037	30587318 02 1	-0194	11711773 06 1	-0732	00000000 00 0	00 0	0000
042651.000	33449019 03 1	0001	30820427 02 1	-0245	11711191 06 1	-0254	00000000 00 0	00 0	0000
042751.000	33450015 03 1	0121	31033562 02 1	-0207	11710613 06 1	-0674	00000000 00 0	00 0	0000
042851.000	33451010 03 1	0023	31286728 02 1	-0207	11710037 06 1	-0889	00000000 00 0	00 0	0000
042951.000	33452005 03 1	0145	31519916 02 1	-0358	11709463 06 1	-0957	00000000 00 0	00 0	0000
043051.000	33452998 03 1	0017	31753135 02 1	-0249	11708893 06 1	-0273	00000000 00 0	00 0	0000
043151.000	33453991 03 1	0127	31986377 02 1	-0221	11708324 06 1	-0557	00000000 00 0	00 0	0000
043251.000	33454983 03 1	0030	32219646 02 1	-0213	11707759 06 1	-0723	00000000 00 0	00 0	0000
043351.000	33455974 03 1	0068	32452945 02 1	-0305	11707195 06 1	-0469	00000000 00 0	00 0	0000
043451.000	33456965 03 1	0005	32686268 02 1	-0218	11706634 06 1	-0049	00000000 00 0	00 0	0000
043551.000	33457955 03 1	0018	32919613 02 1	-0211	11706076 06 1	-0801	00000000 00 0	00 0	0000
043651.000	33458944 03 1	0080	33152984 02 1	-0184	11705520 06 1	-1182	00000000 00 0	00 0	0000
043751.000	33459932 03 1	0017	33386379 02 1	-0257	11704966 06 1	-0791	00000000 00 0	00 0	0000
043851.000	33460920 03 1	0069	33619796 02 1	-0150	11704414 06 1	-0020	00000000 00 0	00 0	0000
043951.000	33461908 03 1	0028	33853237 02 1	-0184	11703865 06 1	-0518	00000000 00 0	00 0	0000
044051.000	33462894 03 1	0028	34086704 02 1	-0218	11703317 06 1	-0635	00000000 00 0	00 0	0000
044151.000	33463880 03 1	0125	34320194 02 1	-0232	11702772 06 1	-0146	00000000 00 0	00 0	0000
044251.000	33464865 03 1	0221	34553703 02 1	-0166	11702229 06 1	-0156	00000000 00 0	00 0	0000
044351.000	33465849 03 1	0318	34787235 02 1	-0160	11701688 06 1	-0859	00000000 00 0	00 0	0000
044451.000	33466832 03 1	0085	35020790 02 1	-0176	11701150 06 1	-1182	00000000 00 0	00 0	0000
044551.000	33467815 03 1	0029	35249364 02 1	-0210	11700613 06 1	-0508	00000000 00 0	00 0	0000
044651.000	33468797 03 1	0068	35487961 02 1	-0125	11700078 06 1	-0195	00000000 00 0	00 0	0000
044751.000	33469778 03 1	0076	35721580 02 1	-0141	11699545 06 1	-0879	00000000 00 0	00 0	0000
044851.000	33470759 03 1	0163	36188873 02 1	-0292	11698485 06 0	110.0713	00000000 00 0	00 0	0000
044951.000	33471739 03 1	0067	36422546 02 1	-0208	11697957 06 0	96.7256	00000000 00 0	00 0	0000
045051.000	33472718 03 1	0091	36656242 02 1	-0184	11697432 06 0	93.7998	00000000 00 0	00 0	0000
045151.000	33473696 03 1	0046	369461948 02 1	-0249	00000000 00 0	0000	00000000 00 0	00 0	0000
050351.000	33485376 03 1	0004	39461948 02 1	-0307	11690759 06 1	-0313	00000000 00 0	00 0	0000
050451.000	33486345 03 1	0111	39695862 02 1	-0225	11690255 06 1	-0283	00000000 00 0	00 0	0000
050551.000	33487312 03 1	0004	39923786 02 1	-0000	11689752 06 1	-0801	00000000 00 0	00 0	0000
050651.000	33488279 03 1	0060	00000000 00 0	-0000	11689752 06 1	-0801	00000000 00 0	00 0	0000

JOBJET  
ITERATION 3

TIME	EL/DEC	AZ/HA	CL/C2/C3/R.	RANGE	
050751.000	.33489245 03 1	.40397686 02 1	.11689250 06 1	-.0840	.0000
050851.000	.33490210 03 1	.40631653 02 1	.11688750 06 1	.0000	.0000
050951.000	.33491175 03 1	.40865635 02 1	.11688251 06 1	.0303	.0000
051051.000	.33492138 03 1	.41096632 02 1	.11687753 06 1	.0908	.0000
051151.000	.33493101 03 1	.41336641 02 1	.11687256 06 1	.0996	.0000
051251.000	.33494063 03 1	.41567661 02 1	.11686760 06 1	.0371	.0000
051351.000	.33495024 03 1	.41801697 02 1	.11686265 06 1	-.0156	.0000
051451.000	.33495985 03 1	.42035740 02 1	.11685772 06 1	-.0781	.0000
051551.000	.33496944 03 1	.42269798 02 1	.11685279 06 1	-.0527	.0000
051651.000	.33497902 03 1	.42503864 02 1	.11684787 06 1	.0049	.0000
051751.000	.33498861 03 1	.42737941 02 1	.11684297 06 1	.0723	.0000
051851.000	.33499818 03 1	.42972030 02 1	.11683807 06 1	.0908	.0000
051951.000	.33500774 03 1	.43206131 02 1	.11683318 06 1	.0605	.0000
052051.000	.33501729 03 1	.43440242 02 1	.11682830 06 1	.0020	.0000
052151.000	.33502684 03 1	.43674362 02 1	.11682342 06 1	-.0654	.0000
053051.000	.33511237 03 1	.45781856 02 1	.11677989 06 1	-.0879	.0000
053151.000	.33512183 03 1	.46016064 02 1	.11677508 06 1	-.0215	.0000
053251.000	.33513128 03 1	.46250274 02 1	.11677028 06 1	.0615	.0000
054251.000	.33522531 03 1	.48592762 02 1	.11672247 06 1	.0273	.0000
054351.000	.33523467 03 1	.49061325 02 1	.11671771 06 1	-.0488	.0000
054451.000	.33524401 03 1	.49626202 02 1	.11671294 06 1	-.0645	.0000
054551.000	.33525335 03 1	.49764202 02 1	.11670818 06 1	-.0635	.0000
054651.000	.33526268 03 1	.49998501 02 1	.11669866 06 1	-.0420	.0000
054751.000	.33527200 03 1	.50232799 02 1	.11669390 06 1	.0566	.0000
054851.000	.33528131 03 1	.50467105 02 1	.11668914 06 1	.1162	.0000
054951.000	.33529061 03 1	.50701416 02 1	.11668439 06 1	.0547	.0000
055051.000	.33530917 03 1	.50933730 02 1	.11667963 06 1	.0332	.0000
055151.000	.33531845 03 1	.51170044 02 1	.11667535 06 1	-.0684	.0000
055251.000	.33532771 03 1	.51398501 02 1	.11667011 06 1	-.0498	.0000
055351.000	.33533696 03 1	.51633683 02 1	.11666535 06 1	-.0508	.0000
055451.000	.33534621 03 1	.51873004 02 1	.11666059 06 1	-.0107	.0000
055551.000	.33535545 03 1	.52107330 02 1	.11665583 06 1	.0508	.0000
055651.000	.33536467 03 1	.52341656 02 1	.11665106 06 1	.1133	.0000
055751.000	.33537389 03 1	.52575985 02 1	.11664630 06 1	.0566	.0000
055851.000	.33538309 03 1	.52810310 02 1	.11664153 06 1	-.0176	.0000
060051.000	.33540147 03 1	.53044640 02 1	.11663676 06 1	-.0693	.0000
060151.000	.33541065 03 1	.5327972 02 1	.11663199 06 1	-.0791	.0000
060251.000	.33541982 03 1	.5347638 02 1	.11662721 06 1	-.0469	.0000
060351.000	.33542898 03 1	.5367306 02 1	.11662243 06 1	.0098	.0000
060451.000	.33543812 03 1	.5386972 02 1	.11661765 06 1	.0469	.0000
060551.000	.33544726 03 1	.5405642 02 1	.11661287 06 1	.1094	.0000
060651.000	.33545639 03 1	.54216308 02 1	.11660808 06 1	.0342	.0000
060751.000	.33546551 03 1	.54385978 02 1	.11660328 06 1	-.0166	.0000
060851.000	.33547462 03 1	.54519311 02 1	.11659849 06 1	-.1045	.0000
060951.000	.33548372 03 1	.54651536 02 1	.11659368 06 1	-.0674	.0000
061051.000	.33549281 03 1	.54787981 02 1	.11658888 06 1	-.0264	.0000
061151.000	.33550189 03 1	.54919311 02 1	.11658407 06 1	.0801	.0000
061251.000	.33551096 03 1	.5505644 02 1	.11657925 06 1	.0869	.0000
061351.000	.33551996 03 1	.5522314 02 1	.11657443 06 1	.0869	.0000
061451.000	.33552907 03 1	.55387981 02 1	.11656960 06 1	-.0117	.0000
061551.000	.33553811 03 1	.55523505 02 1	.11656477 06 1	-.0664	.0000
061651.000	.33554714 03 1	.55679364 02 1	.11655993 06 1	-.0732	.0000
061751.000	.33555616 03 1	.55828289 02 1	.11655509 06 1	-.0547	.0000
061851.000	.33556516 03 1	.56000000 00 0	.11655024 06 1	.0488	.0000
061951.000	.33557416 03 1	.56171500 00 0	.11654538 06 1	-.0791	.0000
				.0781	.0000

ITERATION 3 OPTION 0 EPOCH 62/04/23 210419.000 CLOCK 182420 LIGHT TIME ON KEYS 110620140770									
STATION	TYPE	N	SIGMA MEAN	WEIGHT SK	RMS NOISE	SKEW EXCESS	2ND MOMENT S	S1 S2	
JOBJET	C2	377	.78417636-01	.10000000 01	.78432177-01	.41837613 02	.61516064-02	.00000000 00	
			-.15101749-02	.00000000 00	.77651537-01	.49114225 01	.10000000 01	.00000000 00	
OCWJET	HA	35	.90436313-02	.10000000 01	.91166099-02	.67605452 00	.83112577-04	.00000000 00	
			-.11512211-02	.00000000 00	.22313152-01	.38221076 01	.10000000 01	.00000000 00	
OCWJET	DEC	35	.71416538-02	.10000000 01	.73137655-02	-.19311085 00	.53491166-04	.00000000 00	
			-.15773228-02	.00000000 00	.17503270-01	.37276283 01	.10000000 01	.00000000 00	
JETMTS	F2	703	.63886033 00	.10000000 01	.63887734 00	-.31804616 03	.40816426 00	.00000000 00	
			-.46619398-02	.00000000 00	.63443132 00	-.81928056 00	.10000000 01	.00000000 00	
JOBJET	HA	740	.20347438-01	.10000000 01	.20419193-01	-.17099729 00	.41694346-03	.00000000 00	
			-.17103298-02	.00000000 00	.68756893-01	.72922705 01	.10000000 01	.00000000 00	
JOBJET	DEC	719	.11883145-01	.10000000 01	.11982640-01	-.58069915 00	.14358366-03	.00000000 00	
			-.15409471-02	.00000000 00	.18113227-01	.37155577 01	.10000000 01	.00000000 00	

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